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# National Pathology Conference 2024: Towards Dynamic and Excellent Pathology Services, organised by the Negeri Sembilan Pathology Services, 2nd - 3rd October 2024, Klana Resort, Seremban, Negeri Sembilan. Abstracts of oral and poster presentations are as follows.

*ABSTRACTS*

**ORAL 01: Chemical Pathology**

**Cost-Effectiveness Strategies in Utilisation of High-Sensitivity Cardiac Troponin I (hs-cTnI) at Hospital Raja Perempuan Zainab II (HRPZ II) in Kota Bharu, Kelantan.**

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High-Sensitivity Cardiac Troponin I (hs-cTnI) assays play a crucial role in diagnosing Acute Myocardial Infarction (AMI),[1] yet excessive and inappropriate hs-cTnI tests request present financial challenges. In our hospital, as for cost optimisation, Creatinine Kinase-MB (CK-MB) is used as an initial test. This study aims to evaluate the appropriateness of hs-cTnI testing and its financial impact, thus enhancing the cost-effectiveness by correlating hs-cTnI with CK-MB results. Retrospective data from *Sistem Pengurusan Pesakit (SPP)* and Laboratory Information System (LIS) from 1st December 2023 to 29th February 2024 were analysed. Financial implications were evaluated based on cost per test, with cost optimisation strategies focusing on determining optimal CK-MB cut-off values through ROC curve analysis using MedCal 22 software. The audit findings highlighted a notable increase in hs-cTnI test requests, with the majority being related to cardiac reasons (63.6%). Inappropriate hs-cTnI test requests incurred RM11,543.10 in costs; while indicated requests amounted to RM 16,590.42 over the three months duration. These inappropriate hs-cTnI requests imposed a significant financial burden, prompting improvement strategies such as clinician education, collaborative Standard Operating Procedure guideline development, and CK-MB cut-off implementation. A CK-MB >91U/L demonstrated 99.26% specificity in distinguishing cardiac from non-cardiac conditions. The over utilisation of inappropriate hs-cTnI testing led to unnecessary expenses. Implementing a CK-MB cut-off >91 U/L can enhance cost-effectiveness of hs-cTnI, optimise hs-cTnI utilisation and ultimately enhance patient care at Hospital Raja Perempuan Zainab II in Kota Bharu, Kelantan.

**ORAL 02: Medical Microbiology**

**Evaluation Study of The Satellitism Test for The Laboratory Identification of *Haemophilus influenzae* In Microbiology Unit Hospital Tuanku Fauziah Perlis**

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Satellitism test are the most common method used in clinical laboratories to identify *Haemophilus influenzae,* a pathogen that causes community and nosocomial pneumonia. The aim of this study is to evaluate the performance of satellitism test against Matrix-assisted laser desorption ionisation time-of-flight mass spectrometry (MALDI-TOF MS). A total of 30 samples from March to May 2024 were isolated from respiratory samples cultured in Microbiology laboratory, Hospital Tuanku Fauziah, Perlis. First, a loopful of suspected *Haemophilus* colonies was streaked evenly onto blood agar and nutrient agar. Second, a pure culture of *Staphylococcus aureus* (ATCC 25923) was streaked across each of the inoculated plates. Third, the plates were placed in carbon dioxide incubator at 35-37 °C for 18-24 hours and then examined for growth and satellite colonies. Satellite colonies were defined as small colonies growing in the vicinity of *S. aureus*, where the tested bacteria were inoculated. All of the isolated samples underwent confirmation test by using rapid detection of mass of molecules, MALDI-TOF MS. The interpretative outcome of both test was evaluated for the degree of agreement using the kappa coefficient (κ). As a result, satellitism test showed good percentage of agreement 86.67% (26/30) with a moderate value of κ coefficient (0.69) (95% CI: 70.32-94.69%). The sensitivity of the satellitism test for detecting *H. influenzae* was 100% and the specificity was 82.61%. Therefore, both the test methodologies can be reliably used in place of each other for the identification of *H. influenzae* whereas satellitism is the most cost-effective test among other commercial tests available.

**ORAL 03: Haematology**

**The Effectiveness of FBC Slide Check Criteria Practice in Hospital Raja Perempuan Zainab II (HRPZII)**

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FBC slide check (FBCSC) is a procedure whereby microscopic examination of blood smear is performed when certain criteria are

met. We implemented the FBCSC procedure in June 2022 after endorsement of the criteria by the Malaysian national haematology standardisation committee. Objective of this study is to assess the effectiveness of FBCSC criteria in detecting the significant haematological condition. Data was collected from Haematology laboratory, Hospital Raja Perempuan Zainab II (HRPZII) from the period of January until December 2023. A total of 166,600 FBC samples were processed in 2023, 360 (0.216%) of them has met the FBCSC criteria. Out of those, 95.56% fulfilled the platelet criteria and platelet clumping was identified in 5.81% of them. Abnormal cells or blasts were identified in 5.83% of total FBCSC and were finally diagnosed as haematological malignancy. This FBCSC procedure is very helpful and the criteria used are effective for early detection of significant haematological condition. It can facilitate clinician in making prompt decision for immediate patient management.

**ORAL 04: Anatomic Pathology**

**Unmasking the Enigma of Calciphylaxis Cutis: A case series**

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Calcific uremic arteriolopathy also known as calciphylaxis is a rare but serious condition characterised by vascular calcification and skin necrosis. It primarily occurs in patients with end-stage renal disease (ESRD) but can also affect patients with normal parathyroid hormone (PTH) under certain contexts. This writing highlight three cases of calciphylaxis. Two of the patients have ESRF and one with normal parathyroid hormone. All of them presented with painful plaque which then become ulcerated and necrotic. Two of them succumbed due to the complication and one of them survive after treatment with sodium thiosulphate. Calciphylaxis is often mistaken for other dermatological conditions such as venous stasis dermatitis or infection. Factors contributing to its development include hyperparathyroidism, obesity, malnutrition, and certain medications (e.g., warfarin). Our writing highlights the importance of Recognising calciphylaxis in patients with established kidney disease. Prompt intervention not only can alleviate suffering but also may significantly affect morbidity and mortality. Further research into effective treatments and preventive strategies is essential.

**Poster Presentation: Anatomic Pathology**

**Unlocking the Genetic Secrets of CMMRD: a Case Study in Inherited Malignant Brain Tumour**

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Constitutional Mismatch Repair Deficiency (CMMRD) is an exceptional yet challenging rare autosomal recessive cancer predisposition syndrome with a high risk of developing a broad spectrum of malignancies, often in childhood, adolescence, and young adulthood. We present a compelling case of CMMRD in an 8-year-old of Indian descent, showcasing the complex interplay between genetic predisposition, tumour spectrum, and therapeutic challenges. He presented with neurological symptoms caused by an early onset medulloblastoma and associated skin changes resembling Neurofibromatosis type 1. Further history revealed parental consanguinity, a deceased sister with left heart hypoplasia, a deceased brother with mediastinal T-cell lymphoblastic lymphoma, and two siblings with partial eyelid ptosis. Clinical suspicion of CMMRD-related malignancy was confirmed through immunohistochemistry, which showed a loss of nuclear protein expression of MSH2 and MSH6 gene proteins, and sequencing revealed a biallelic mutation in the *MSH6* gene. Germline testing also unmasked the presence of heterozygous pathogenic *MSH6* variant in both parents and one living sister. Beyond a confirmed diagnosis, genetic testing also yields revelations into the genetic basis of the disease, with potential implications for genetic counseling and future close surveillance for him and his family. This case highlights the clinical heterogeneity of CMMRD, emphasises the importance of tailored surveillance and management strategies, and underscores the need for clinicians and pathologists to be vigilant in diagnosing potential CMMRD cases. It also provides the affected family with insight into their inherited genetic defect and closure regarding the death of their family members.

**A Rare Case of Epithelial-Myoepithelial Carcinoma Ex Pleomorphic Adenoma of the Palate**

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Epithelial-myoepithelial carcinoma (EMC) is a rare type of salivary gland cancer, making up only 1% of all cancers originating in salivary glands. This lesion can arise *de novo* or from an existing pleomorphic adenoma (PA). We present the case of a 76-year-old man who was diagnosed histologically with PA of the palate and underwent an excisional biopsy in 2017. He presented again in 2023 with a history of palatal swelling. He underwent a left partial maxillectomy and tumour debulking. A histopathological examination revealed a multilobated, unencapsulated cellular tumour with a focally infiltrative margin. The tumour cells are arranged in sheets, nests, clusters, strands, and tubules embedded within fibromyxoid, chondromyxoid, and fibrohyalinised stroma. The cells are predominantly made up of abluminal cells with minimal luminal epithelial cells. These tumours appear to be the dominant component, and the presence of chondromyxoid stroma in the background suggests a residual PA. Immunohistochemistry supports the histomorphology of EMC. EMC is a rare cancer type. Most of them originate in the parotid gland, while the rest affect the other

major or minor salivary glands, sinonasal tract, and bronchus. This cancer has a favourable outlook. A high-grade transformation is a poor prognosticator. Epithelial-Myoepithelial Carcinoma Ex Pleomorphic Adenoma is a rare condition that poses diagnostic difficulties. Therefore, it is crucial to recognise and identify this entity, since it holds substantial clinical and pathological significance.

**Hepatic Neuroendocrine Carcinoma with Unusual Thyroid Follicular-like Morphologic Characteristics**

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Primary hepatic neuroendocrine tumour (PHNET) first described by Edmonson in 1958, is extremely rare, with fewer than 150 cases described in literature. A 18 years old, Malay, female presented with acute right hypochondriac pain, itchiness and jaundice. CT abdomen showed a large, lobulated enhancing mass in the right lobe of the liver measuring 9.2 × 10.3 × 23.4cm. The patient underwent extended right hemihepatectomy and biliary reconstruction. The tumour characteristic and immunohistochemical profiles were consistent with the diagnosis of PHNET with unusual thyroid follicular-like morphologic characteristics. Microscopically, this rare variant of PHNET had thyroid-like morphologic characteristics in addition to the usual histology of high-grade neuroendocrine carcinoma. They were micro and macrofollicles containing colloid like secretions. These areas were negative for TTF-1 and Thyroglobulin, therefore excluding metastasis from the thyroid gland and lung. The areas with high-grade neuroendocrine carcinoma were positive for Synaptophysin and Chromogranin. PHNETs are rare tumours and can present with varying histological findings including thyroid follicular-like morphological characteristics. The absence of a primary thyroid tumour, knowledge of morphological features and the lack of thyroid markers in the liver tumour are useful in the diagnosis of this rare and new morphological variant of PHNET.

**Uterine Leiomyoma with Amianthoid-like Fibres: A Rare Case Report**

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Uterine leiomyomas are common benign tumours originating from smooth muscle cells of the uterus. However, presence of amianthoid-like fibres in leiomyoma is extremely rare. We report a case of a 47-year-old female with underlying history of laparotomy oophorectomy for right mucinous adenocarcinoma of the ovary, stage 2c in 2018. She completed 6 cycles of chemotherapy in March 2019 and was tumour free since then. Surveillance imaging studies revealed multiple intramural fibroids and subsequent Gynaecology follow-up noted the fibroids are increasing in size. The patient then underwent a total abdominal hysterectomy, and histopathological examination of the uterus revealed spindle cell population consistent with leiomyomata with the presence of numerous amianthoid-like fibres. These fibres were identified as eosinophilic, acellular, and refractile material under light microscopy. The amianthoid-like fibres were highlighted by MT stain. The occurrence of amianthoid-like fibres in uterine leiomyoma is rare, with few cases reported in the literature. Their presence may complicate the diagnosis and necessitates thorough histopathological evaluation. Although the exact pathogenesis of these fibres is unclear, they are thought to result from degenerated smooth muscle cells. Recognising this rare histological feature is crucial for accurate diagnosis and management. This case underscores the importance of considering atypical histological features such as amianthoid-like fibres in uterine leiomyoma. Further research is needed to understand the clinical implications and pathogenesis of these fibres.

**Growing Teratoma Syndrome with Coexistence Gliomatosis Peritonei in a 14-year-old Girl During Chemotherapy in an Ovarian Germ Cell Tumour - A Rare and Intriguing Phenomenon**

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Growing teratoma syndrome (GTS) is a rare entity defined by the benign enlargement of a tumour mass detected during or after chemotherapy for a germ cell tumour despite normalisation of tumour markers. Gliomatosis peritonei (GP) is an uncommon condition characterised by the presence of peritoneal implants consisting of nodules of mature glial tissue in patients with ovarian teratoma. Coexistent GTS and GP arising during chemotherapy for ovarian germ cell tumour is extremely rare and can be misdiagnosed as recurrent or progressive disease. We present a case of a 14-year-old girl diagnosed with GTS with synchronous GP during chemotherapy for an ovarian germ cell tumour. The alpha-fetoprotein concentration decreased from 357 ng/mL to 7.85 ng/mL (within the normal range) after 2 cycles of chemotherapy. However, a repeat CT scan revealed an enlarging 19 cm abdominopelvic mass. During an exploratory laparotomy, a large right ovarian tumour with mixed cystic and solid components was discovered, along with multiple solid nodules on the peritoneal surfaces. The patient underwent right salpingo-oophorectomy, en bloc tumour resection involving the right diaphragm, appendicectomy, and peritonectomy. Histological examination of the ovarian tumour revealed mature teratomatous components with extensive haemorrhage and necrosis, devoid of immature elements or other germ cell tumour components, as well as diffuse GP seen in all the peritoneal nodules, thus confirming the coexistence of GTS and GP in this patient. Recognising this syndrome is important to avoid misdiagnosis and unnecessary chemotherapy. The prognosis of these tumours is excellent after optimal surgical excision.

**SARS-CoV-2 Placentitis Leading to Stillbirth**

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During the pre-vaccination period, COVID-19 infection in pregnancy is associated with significant risk of maternal morbidity and mortality. Although there is a low rate of positive SARS-CoV-2 tests in infants born to mothers with COVID-19, pathological changes of placentas from COVID-positive mothers have been reported. We would like to share a documented case of SARS-CoV-2 placentitis resulting in stillbirth from histopathological perspective. A 27-year-old lady, G1P0 with COVID category 1, presented with pregnancy loss at 23 weeks gestation. The placenta received had a weight of less than 10$^{th}$ centile for gestational age and showed significant yellowish-tan ill-defined plaques within parenchyma on cut surface. Histopathologically, the placenta showed extensive perivillous fibrin with trophoblasts necrosis. There was dense intervillositis of CD68-positive cells associated with intervillous thrombi. SARS-CoV-2 protein immunohistochemistry was detected on the villous surface trophoblasts. The histologic manifestation of COVID-19 in the placenta is ongoing research and studies showed associations between maternal SARS-CoV-2 infection and specific placental histopathology. The destructive features of marked increase perivillous fibrin, intervillous thrombosis and intervillositis amongst documented pathological changes compromising the placental function. Supportive SARS-CoV-2 immunohistochemistry is a useful diagnostic adjunct as evidence of intrauterine transplacental transmission. (This is part of a study funded by the USIM Research Grant Scheme (PPPI/FPSK/0122/USIM/13922)).

**A Rare Case of Cribriform Morular Thyroid Carcinoma**

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Cribriform morular thyroid carcinoma (CMTC) is a rare malignant thyroid tumour of variable growth pattern, driven by WNT/beta-catenin pathway activation. It is known to occur almost exclusively in young females less than 40 years of age. We report a case of 21 years old female who has no underlying medical illness, experiences a progressive increase in the size of her right neck swelling over a period of one-year. Ultrasound of the neck shows enlarged right thyroid lobe (TIRADS 4) and her fine needle aspiration cytology is reported as suspicious of malignancy. Subsequently, a right hemithyoidectomy is performed. Histology reveals a fairly circumscribed tumour giving rise to nodular appearance, with variable morphology of malignant cells which appear dilated and branching acinar, fused and cribriform architecture, papillary, trabeculae and sheets. There are no morules or nuclear features of papillary thyroid carcinoma. Immunohistochemistry shows strong nuclear and cytoplasmic staining for beta-catenin. CMTC is currently considered as a thyroid tumour of uncertain histiogenesis. It is associated with familial adenomatosis polyposis (FAP) or can occur sporadically. A close differential diagnosis for this case based on morphology is columnar cell subtype of papillary thyroid carcinoma. However, this entity is negative for beta-catenin. It is crucial to alert clinicians to screen for FAP as the management varies.

**'Oh, Skin Lumps! Check Your Kidneys!': A Case Report of Bilateral Multifocal Epithelioid Angiomyolipoma in Polycystic Kidneys**

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Angiomyolipomas (AMLs) are neoplasms of perivascular epithelioid cells (PEComas). Epithelioid AMLs (EAMLs) are a potentially-malignant variant and may be associated with tuberous sclerosis complex (TSC). Accurate diagnosis is crucial for patient management. A 51-year-old female with bilateral polycystic kidneys, facial sebaceous adenoma and café au lait over her back and thigh, underwent bilateral radical nephrectomies for enhancing kidney lesions. Gross examination showed multifocal, tan-coloured lesions. Histology revealed a mixture of epithelioid cells (over 50%), spindled cells, mature adipocytes, and poorly-organised vascular channels. Epithelioid cells were diffusely positive for HMB45 and SMA, focally for desmin, and negative for CK7 and PAX8. The diagnosis was bilateral multifocal EAML in polycystic kidneys, with a presumptive diagnosis of TSC. Skin punch biopsies from her nose and thigh confirmed benign angio-fibromatous and collagenous lesions, consistent with angiofibroma and connective tissue nevus, respectively. About 80% of TSC patients develop renal AMLs. Mutations of *TSC1* or *TSC2* genes confirm TSC. However, 10-25% of patients have no detectable mutations, necessitating clinical diagnosis. Distinguishing EAML from renal cell carcinoma (RCC) can be challenging. EAML typically expresses HMB45, Melan-A, SOX10, desmin, and SMA, with negative epithelial markers and S100. RCC is positive for epithelial markers and negative for melanocytic markers. Large tumours may bleed. Tumours under 40 mm are monitored annually. Symptomatic or larger tumours require surgical or radiological intervention. EAML is a rare, potentially malignant AML variant linked with TSC. Accurate diagnosis and management require a multidisciplinary approach and careful histopathological evaluation.

**Neonatal Haemochromatosis: Deciphering the Role of Gestational Alloimmune Disease**

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Gestational alloimmune liver disease (GALD) is a rare maternal-foetal alloimmune disorder causing fatal liver injury with hepatic and extra-hepatic iron accumulation. We report a case of neonatal liver failure (NLF) with coagulopathy and direct hyperbilirubinemia. A diagnosis of neonatal haemochromatosis (NH) secondary to GALD was made on postmortem. An infant, born preterm presented with petechiae, bruises and hepatomegaly. Parents were non-consanguineous with a previous history of neonatal deaths. The laboratory parameters showed thrombocytopenia, abnormal liver function (hypoalbuminemia, coagulopathy), and an increase in liver enzymes. Viral screening, ultrasound and inborn error metabolism (IEM) screenings were unremarkable. Autopsy was performed and diagnosis of GALD-NH was confirmed by significant multisystem iron (hemosiderin) depositions (hepatic and extra-hepatic), massive necrosis of liver parenchyma, perisinusoidal fibrosis and marked cholestasis. Our patient presented with antenatal distress signs of prematurity, oligohydramnios, failure of liver function (coagulopathy) and evidence of acute liver injury in keeping with NLF, suggesting a congenital liver disease due to prenatal insult. The possible causes of significant extra-hepatic siderosis include GALD, IEM and mitochondrial respiratory chain disorder (MRCD). GALD was favoured as investigations for IEM and histology for MRCD were negative. GALD is a rare but documented differential for severe NLF. Lethal recurrence in subsequent pregnancies is high. Early use of intravenous immunoglobulin (IVIG) is crucial to allow longer survival of the neonate.

**Intravascular Large B-cell Lymphoma Presenting as a Multinodular Goitre**

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Intravascular Large B-cell Lymphoma (IVLBCL) is a rare variant of Large B-cell Lymphoma. It has an estimated incidence of <1 person per million population. We present the histopathological finding of IVLBCL in the thyroid of a patient presented as multinodular goitre. A 74-year-old lady with underlying multinodular goitre with retrosternal extension and tracheal compression presented with exertional dyspnea. Otherwise, she was euthyroid. Clinically there was no lymphadenopathy or hepatosplenomegaly. Subsequently, hemithyroidectomy was performed. Macroscopic examination shows multiple nodules with two dominant nodules displaying brownish myxoid appearance. Microscopically, large atypical lymphoid cells are seen distending the lumen of capillaries within an adenomatoid nodule without any extravascular growth. These cells show irregular nuclear membrane, hyperchromatic to vesicular nuclei, prominent single to multiple nucleoli and scanty cytoplasm. They are positive for CD20 and show non-germinal center subtype with a high Ki67 proliferative index (>95%). The background thyroid parenchyma exhibits nodular hyperplasia. Therefore, diagnosis of classic IVLBCL was rendered. IVLBCL usually presents with non-specific symptoms without lymphadenopathy and the absence of lymphoma cells in peripheral smears. This clinical presentation causes delayed diagnosis and guarded prognosis. It may involve any organs including brain, lung, skin and spleen. Only a few cases reported on IVLBCL in thyroid gland. Chemotherapy with rituximab has shown to improve clinical outcome. IVLBCL can occur in thyroid gland hence the role of meticulous histomorphological examination and judicious use of immunohistochemistry stains cannot be overemphasised to prevent misdiagnosis in suspected cases.

**Uterine Intravenous Leiomyoma with Dissecting Component: An Unusual Variant**

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Leiomyoma is the most common mesenchymal neoplasm in the uterus. Variants like intravenous leiomyoma, where smooth muscle proliferation involves venous spaces are exceptionally rare. A 48-year-old female with heavy menstrual bleeding and anaemia was diagnosed with multiple uterine fibroids via transabdominal sonography. Intraoperatively, the largest fibroid was 6x7 cm at the fundus. Two ill-defined subserosal greyish masses measuring 20mm and 45mm in diameter with slit-like spaces and worm-like tumour plugs in vessels were also identified. Histology showed intravascular growth of benign spindle cells in fascicles within hydropic and hyalinised stroma lined in areas by endothelial cells. Areas of irregular dissection by spindle cells through the myometrium and multiple thick-walled vessels containing blood are observed. Nuclear atypia, mitosis, or necrosis were absent. Desmin, SMA, ER, and focal CD10 immunostaining were positive, while CD34 highlighted the endothelium and surface of the mass. A diagnosis of intravenous leiomyoma with a dissecting component was made. It is a rare variant showing venous intrusion of benign smooth muscle, potentially linked to benign metastasizing leiomyoma. Despite its benign morphology, it may exhibit more aggressive behavior. Some suggest it originates from vascular smooth muscle, but histologic and cytogenetic evidence showed similarities with leiomyoma of myometrial origin with venous growth likely due to additional genetic alterations. Factors associated with recurrence inconsistently include younger age, large lesions (≥ 7 cm), extension to the broad ligament, type of surgical approach and incomplete resection. Awareness is crucial for distinguishing it from other benign uterine neoplasms. As the intravenous extension might be considered as a more aggressive behaviour with risk of recurrence, careful follow-up is warranted.

**Eye-Conic Gliomas: A Case of Optic Nerve Glioma**

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Optic nerve gliomas (ONGs) are rare, low-grade childhood tumours, often linked to neurofibromatosis type 1 (NF1), but may occur sporadically. We report a case of sporadic ONG in a 3-month-old boy. The patient presented with worsening left eye protrusion for a month. Examination revealed proptosis, inferior dystopia, and optic disc swelling. Imaging showed diffusely thickened left optic nerve (4.4 cm × 1.4 cm × 2.1 cm) with enhancing perineural tissues. Biopsy revealed a biphasic tumour with alternating cellular and loose microcystic regions. The neoplastic cells were GFAP-positive, monomorphic and pilocytic. Rosettes, Rosenthal fibres, eosinophilic granular bodies, microvascular proliferation, mitosis, and necrosis were absent. Ki-67 index was 2-5%. Final diagnosis was low-grade glioma, WHO grade 2. Molecular studies identified *BRAF V600E* mutation, with no *IDH1/2, TERTp, ATRX, TP53, KRAS, NF1, PDGFRA, PIK3CA, PIK3R1, FGFR1, EGFR,* chromosome 7, *CDKN2A/2B* mutations or 1p/19q co-deletions. ONGs are frequently pilocytic astrocytomas, but can also be diffuse gliomas. Morphology alone is insufficient for grading due to tumour biology variability. The lack of classic features and a low Ki-67 index suggests a low-grade tumour, while *BRAF V600E* mutation, associated with higher-grade gliomas, supports a WHO grade 2 diagnosis. This mutation implies a more aggressive tumour with potential chemotherapy resistance and highlights the value of targeted therapy. Incorporating molecular data into glioma grading provides a more accurate and comprehensive approach to diagnosis and treatment.

**Navigating The Challenges of Renal Ewing Sarcoma: A Rare Case of Aggressive Tumour with Multidisciplinary Management**

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Ewing sarcoma/primitive neuroectodermal tumour (ES/PNET) is a rare, aggressive malignancy that affects children and young adults. It typically presents as a high-grade, small round cell tumour with neuroectodermal differentiation. Although primarily a bone tumour, ES/PNET can also occur in extraskeletal sites, such as the renal pelvis. We report the case of a 19-year-old female with a right renal mass, IVC, and right renal vein thrombosis complicated by left pleural effusion and pulmonary embolism. CT imaging revealed a heterogeneous right renal mass extending into the right renal hilum, vein, and IVC. The patient was scheduled for neoadjuvant chemotherapy and CT reassessment was planned to evaluate mass resectability. Renal biopsy revealed sheets of small monotonous cells with high nuclear-to-cytoplasmic ratios and uniform round nuclei, inconspicuous nucleoli, and scanty to moderate cytoplasm. Dilated vascular channels and thrombosed vessels were observed. Immunohistochemistry was positive for CD99 (diffuse), FLI-1, Cyclin D1, focally positive for synaptophysin, and negative for CKAE1AE3, desmin, myogenin, WT1, CD56, and TdT. The Ki67 proliferation index was 40-50%, supporting the diagnosis of ES/PNET. Strong and diffuse membranous expression of CD99 is evident in approximately 95% of Ewing sarcomas. The most common translocation, t(11;22) (q24;q12), results in EWSR1-FLI1 fusion, which is present in approximately 85% of cases. ES/PNET are aggressive, with local invasion and metastatic tendencies. Surgical resection, when feasible, improves the outcomes. Despite its aggressive nature, early diagnosis and comprehensive treatment significantly enhance outcomes, underscoring the need for a multidisciplinary approach involving pathologists, oncologists, and geneticists.

**High-Grade Pilomatrixoma-like Endometrioid Carcinoma of The Ovary: A New Variant**

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Endometrioid carcinoma can show several different types of altered differentiation which may mimic other tumours and constitute diagnostic pitfalls. Endometroid carcinoma may also undergo high-grade divergent differentiation, or they may dedifferentiate completely. We report a rare variant of ovarian endometroid adenocarcinoma. A 58-year-old lady presented with a left ovarian mass. The gross finding shows a multiloculated solid cystic tumour measuring 110 x 110 x 50 mm with adhesions to the lower uterine segment and left parametrium. Microscopy examination shows a tumour with a high-grade and low-grade component. The high-grade component is composed of rounded clusters of basaloid cells with central ghost-like cells and necrosis reminiscent of pilomatrixoma-like features. These cells are positive for beta-catenin, synaptophysin with proficient MMR staining while being negative for ER and PR. The p53 stain shows wild-type staining pattern. Pilomatrixoma-like high-grade endometrioid carcinoma (PiMHEC) is a recently described variant of endometroid carcinoma[1]. In the past, ghost-like cells had been missed and recognised as conventional squamous metaplasia in the routine diagnostic practice. The recognition of PiMHEC is important to avoid diagnostic misinterpretation of this high grade tumour as a low grade malignancy. PiMHEC typically shows a diffuse nuclear β-catenin expression, which reflects underlying *CTNNB1* exon 3 mutations. PiMHEC displays a few characteristic histological and immunohistochemical features and has a highly aggressive behaviour which may warrant its recognition as a distinct entity. A larger case series is needed to establish the diagnostic criteria of PiMHEC to differentiate it from its mimickers as it has both prognostic and therapeutic implications.[1,6]

**Thyroid-Like Follicular Renal Cell Carcinoma: A Case Study of Rare Renal Neoplasm Mimicking Thyroid Morphology**

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Thyroid-like follicular renal cell carcinoma (TFRCC) is a rare and recently recognised subtype of renal cell carcinoma. It is characterised by a morphology resembling follicular carcinoma of the thyroid gland, yet it lacks the thyroid-specific immunohistochemical expression. Due to its rarity, only a limited number of cases have been reported in the literature. A 47-year-old male, with a history of pulmonary embolism, heart failure, and cor-pulmonale secondary to obstructive sleep apnoea, was referred from Hospital Sultan Idris Shah, Serdang for a second opinion. Initially, a solid mass in the right upper pole of the kidney was incidentally noted measuring 2.1 × 2.2 × 3.4 mm, classified as Bosniak grade IIF. The patient otherwise had no history of thyroid lesions or goitre. Histopathological analysis of the renal mass demonstrated a follicular-like architecture with variable sizes of follicles containing eosinophilic colloid-like material. There was no evidence of sarcomatoid differentiation. Immunohistochemical staining revealed that the tumour cells were positive for Pax8, CK19, CK7, Vimentin, and CD10, while negative for RCC, AMACR, TTF, and Thyroglobulin. These findings support the renal origin of the mass, leading to the diagnosis of thyroid-like follicular renal cell carcinoma after excluding the possibility of a thyroid lesion or metastasis. TFRCC is an extremely rare entity, with the majority of cases exhibiting low-grade and indolent course. However, due to distinct malignant potential, complete surgical excision remains the preferred treatment. Recognising TFRCC is crucial for overall appropriate management and prognostication.

**Superficial CD34-Positive Fibroblastic Tumour: Report of A Rare Entity**

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Superficial CD34-Positive Fibroblastic Tumour (SCPFT) is a rare mesenchymal neoplasm of intermediate malignancy, characterised by a superficial location, striking cellular atypia but low mitotic rate, and strong diffuse CD34 positivity. We report a case of SCPFT in a 19 years old lady, presented with swelling at right buttock for 3 years, gradually increasing in size. She was clinically treated as Dermoid cyst. Intraoperative findings were a superficial lesion beneath skin and not involved muscle. A diagnosis of SCPFT was confirmed by histopathology examination (HPE). Grossly the tumour is a well circumscribed, nodular tan homogenous tissue measuring 5cm in largest diameter. HPE showed highly cellular fascicles and sheets of spindle to epithelioid cells with abundant granular to glassy eosinophilic cytoplasm. The tumour cells exhibit marked nuclear pleomorphism, hyperchromatic with prominent nucleoli, frequently intranuclear pseudoinclusions, with few tumour giant cells with bizarre-type nuclei. Mitoses is extremely low (0-2/10hpf). The tumour cells are diffusely positive to CD34 immunostain and patchy positive to Pancytokeratin. PRDM10 gene rearrangement is seen in high number of cases but not performed in this case. As the SCPFT is a low grade mesenchymal neoplasm (French Grade 1), the recognition of the tumour is important to avoid confusion with other cutaneous pleomorphic soft tissue tumours, especially high-grade undifferentiated pleomorphic sarcoma to avoid unnecessary overtreatment. Combination of accurate clinical assessment, histomorphological features and immunohistochemical markers is enough to obtain a correct diagnosis in most cases. The primary treatment of SCPFT is surgical resection with negative margins.

**Complexity of Diagnosing Langerhans Cell Sarcoma: A Case Report**

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Langerhans cell sarcoma (LCS) is an extremely rare and aggressive malignant neoplasm that originates from Langerhans cells. The diagnosis is difficult, requiring extensive immunochemical panels and the exclusion of many differential diagnoses. A case of LCS in a 70-year-old man who presented with left inguinal swelling for 3 months, associated with multiple lymphadenopathies. The diagnosis of possible metastatic melanoma was established after a histologic examination. A thorough physical examination was performed and showed a few skin lesions, which were biopsied and confirmed a benign neoplasm. A revision of the initial histological examination concluded the diagnosis of LCS. Histologic examination revealed a lymph node with tumour necrosis and infiltrated by malignant cells with high-grade cytological features. These malignant cells showed strong and diffuse positivity towards CD1a, S100, Langerin, CD163, and Vimentin, with patchy expression of LCA, CD4, CD68, CD15, and CD30, and were negative for CKAE1/AE3, EMA, Melan A, SOX10, and HMB45. The morphologic clues for LCS are pleomorphic tumour cell nuclei with some wreath-like appearance and nuclear grooves. The latter may not be apparent in some cases. The immunohistochemical expression of Langerhans cell phenotype is variable. Exclusion of more common neoplasms such as metastatic carcinoma, melanoma, and B and T lymphoma is mandatory to avoid overdiagnosis of this rare entity. Due to its rarity, diagnosis is difficult, and standard protocols of treatment for this disease have not yet been identified. The combination of surgical excision, chemotherapy, and radiotherapy can be an effective approach for treatment.

**Eyelid Follicular Squamous Cell Carcinoma: Reevaluating A Common Yet Under-Recognised Cutaneous Neoplasm**

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Follicular squamous cell carcinoma (fSCC) is a subtype of cutaneous squamous cell carcinoma that originates from the hair follicle infundibula. It predominantly affects sun-damaged, hair-bearing skin in elderly males and often presents as nodular lesions. Its unique histopathological features can make differentiation from other skin tumours challenging. A 46-year-old male presented with a 3-year history of a painless, progressively enlarging mass on the right lower eyelid. Examination revealed a pigmented mass measuring 6mm x 7mm, involving the lateral edge of the lower punctum. Microscopic examination showed an exoendophytic tumour with circumscribed borders, displaying confluent infundibular canals and surface hyperkeratosis. The tumour was composed of multiple squamous morules, keratin pearls, and keratinocytes with mild pleomorphic nuclei. Scattered dyskeratotic keratinocytes and focal irregular clusters were observed within the stroma, along with central acantholytic mucin pools and acellular mucin material. These features were consistent with well-differentiated fSCC. The patient is currently under ophthalmological follow-up. Histologically, fSCC displays malignant cytological features, abrupt connections to the epidermis, and distinctive tricholemmal keratinization. Differential diagnoses include keratoacanthoma (KA) and other forms of SCC, with intra-epithelial "follicular" mucin serving as a diagnostic clue. Invasive cases require management similar to conventional SCC, with surgical excision, particularly Mohs micrographic surgery, being preferred. Despite being under-recognised, fSCC presents distinct histopathological features crucial for accurate diagnosis and management. Increasing awareness of these features is essential to avoid misdiagnosis and ensure effective treatment strategies.

**Poster Presentation: Chemical Pathology**

**Green Glow Plasma: Unraveling Methylene Blue-Induced Plasma Discolouration**

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Methylene blue is used intra-operatively for lymphatic mapping during mastectomy with sentinel lymph node biopsy. Occasionally, patients injected with methylene blue may develop temporary bluish discolouration of the skin. Therefore, we present a rare case of greenish discolouration of plasma following methylene blue administration intra-operatively. A 45-year-old female diagnosed with bilateral breast carcinoma underwent mastectomy and sentinel lymph node biopsy. Intra-operatively, methylene blue dye was injected for lymphatic mapping. Post-operatively, the patient developed bluish discolouration over the neck and chest. Blood samples were sent for routine laboratory tests. Upon centrifugation, the plasma was noted to have greenish discolouration. Despite abnormal plasma colour, all routine laboratory test results including full blood count, coagulation profile, liver and renal function tests, were similar with patient's baseline investigations result pre-operatively. The greenish discolouration observed in the plasma post-methylene blue injection is likely attributable to the dye or its metabolites. Previous literature has documented similar instances of greenish discolouration of plasma associated with methylene blue administration. Importantly, our findings demonstrate that this discolouration does not interfere with routine laboratory tests. Methylene blue-induced greenish plasma is a rare occurrence following surgical procedures involving lymphatic mapping. Clinicians and laboratory personnel should be aware that this phenomenon does not interfere with routine laboratory results.

**Neonatal Abstinence syndrome: A Case Review**

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Neonatal abstinence syndrome (NAS) refers to a collection of postnatal withdrawal symptoms among newborns with a history of prolonged in-utero exposure to licit or illicit substances**.** Case 1: Baby of MAJ, 33w5d with birth weight 1.9 kg, delivered via EMLSCS due to placenta abruption. Infant of mother with drug abuse since 20 years ago but the latest intake of ice was 2 days prior to delivery. Currently treated for Neonatal Abstinence syndrome on iv morphine 10 mcg/kg/hr. The toxicology report positive for amphetamine, methamphetamine and morphine. Case 2: Baby of S Clinically term SGA with birthweight 2.03kg. Infant of single mother possible multidrugs abuser, currently treated for Neonatal Abstinence syndrome on oral morphine 0.5mg/kg/day. Toxicology report was positive for amphetamine, methamphetamine and morphine and ephedrine. Urine toxicology done by tandem mass spectrometry LC/MS/MS**.** Maternal use of illicit or prescribed drugs – opioids or non-opioids - during pregnancy leads to foetal exposure. Neonatal abstinence syndrome (NAS) occurs when there is sudden withdrawal of these drugs in the postnatal period. NAS is characterised symptomatically by a constellation of autonomic, gastrointestinal and neurological signs varying from mild to severe in intensity. The American Academy of Paediatrics (AAP) recommends that opioid-exposed neonates be observed for 3–7 days before discharge. Neonates discharged after treatment for NAS will benefit from follow-up in the outpatient setting with neonatologists, dieticians, and physiotherapists.

**Magic Mushroom abuse: A Diagnostic Dilemma**

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Many designer drugs are not detected in workplace or medical drug tests thus it become a diagnostic challenge as well as for law enforcement. MR RMBA 22/M/male was brought to the emergency & trauma department due to abnormal behaviour for 3 weeks associated with irritability and reduced appetite and auditory hallucination. Patient admit taking vape with magic mushroom since 2 years ago. Patient subsequently treated as substance induced mood disorder. Urine toxicology done by tandem mass spectrometry LC/MS/MS negative for dangerous drugs. Urine drug testing in ETD was negative. Abuse of magic mushroom, peyote cactus, or khat may escape detection during routine drug testing, although there is one commercially available immunoassay capable of identifying mescaline and synthetic cathinone. However, due to poor cross-reactivity of psilocin with commercially available amphetamine/methamphetamine immunoassay, such abuse may also be difficult to recognise during routine urine toxicology screen conducted by clinical laboratories. Psilocin is eliminated as psilocin-Oglucuronide. Due to the higher stability, they may extend the time of detection in the urine samples. These can be detected using various techniques such as capillary electrophoresis, gas chromatography, HPLC and also with chemiluminescence techniques. Biosensors can be used in the detection of themycotoxins and ergot alkaloids. Future studies may help in better detection of these compounds in the human samples and also in forensic analysis.

**Pre-operative Optimisation of Glucocorticoid Replacement Therapy: A Case Study on Hydrocortisone Day Curve in Managing Secondary Adrenal Insufficiency**

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Adequate glucocorticoid replacement is important in adrenal insufficiency. The primary goal of glucocorticoid replacement therapy is to improve patient's overall well-being while preventing adrenal crises during stress conditions. We present a case of secondary adrenal insufficiency due to radiotherapy for cerebral neuroblastoma, where persistent hypocortisolaemia posed challenges despite glucocorticoid therapy. A 47-year-old male with panhypopituitarism secondary to radiotherapy for cerebral neuroblastoma was scheduled for tumour excision. He received T. Hydrocortisone (10mg/5mg). Pre-operative random serum cortisol level revealed persistent hypocortisolaemia (<20 nmol/L) despite patient's good compliance to medication and claimed asymptomatic. A hydrocortisone day curve confirmed inadequate treatment: pre-morning cortisol was below the detection limit (<1.50 nmol/L), indicating the absence of endogenous glucocorticoid production, while 3 pm and 6 pm levels remained <50 nmol/L due to delayed and insufficient evening dosing. Adjusting the hydrocortisone regimen (15mg/5mg/5mg) normalised cortisol levels. A stress-dose of glucocorticoids was added, and the surgery was uneventful. Monitoring glucocorticoid replacement primarily relies on clinical judgement, lacking reliable objective assessments. However, during peri-operative periods, measuring cortisol through a hydrocortisone day curve becomes a valuable alternative for guiding therapy and preventing adrenal crises. Optimal replacement aims for 1200 h and 1800 h cortisol levels >50 nmol/L, ideally >100 nmol/L. Notably, afternoon nadirs in twice-daily regimes prompt consideration of thrice-daily dosing. Hydrocortisone day curve is a useful tool that helps adrenal insufficiency treatment optimisation. As a form of personalised treatment approach, this test provides a guide to hydrocortisone dosage adjustment, preventing pre-operative under-replacement that could lead to adrenal crises.

**Pseudohyperkalaemia Manifesting as Discrepancies in Potassium Levels in a Patient with Acute Lymphoblastic Leukemia: A Case Report**

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Severe hyperkalaemia requires urgent treatment due to its potential life-threatening nature, yet caution is warranted when confirming the diagnosis. Our case illustrates such a scenario: pseudohyperkalaemia occurring amidst severe leukocytosis in a patient with acute lymphoblastic leukaemia (ALL). A discrepancy was observed between potassium levels measured in blood gas (2.2 mmol/L) and plasma (9.8 mmol/L). Despite the elevated plasma potassium level, no treatment was administered as the patient showed no discomfort, exhibited no ECG changes indicative of hyperkalaemia, and had no signs of renal dysfunction or hyperglycemia. The sample was non-haemolysed, uncontaminated, and calcium levels were within the normal range. The laboratory initially reported the potassium level as critically high. A peripheral smear revealed ALL with blast crisis, showing 72% blast cells, and the abnormal white blood cell (WBC) count was beyond the assay's range. The discrepancies in potassium values, in conjunction with the elevated WBC count and absence of hyperkalaemia symptoms, led to a diagnosis of pseudohyperkalaemia. Pseudohyperkalaemia is characterised by a serum-to-plasma potassium concentration difference exceeding 0.4 mmol/L, with serum levels typically higher when both samples are collected simultaneously, stored at room temperature, and tested within an hour. The diagnosis of pseudohyperkalaemia should be considered when there is elevated potassium without clinical signs of hyperkalaemia, a normal

ECG, and extreme leukocytosis. Accurate diagnosis is crucial to avoid unnecessary treatments based on falsely elevated potassium levels. Prompt recognition and differentiation of pseudohyperkalaemia from true hyperkalaemia are essential for appropriate medical management.

**Abnormal Serum Separation in A Multiple Myeloma Case**

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M protein from myeloma cells has been recognised as a source of interference in laboratory assay. We present a case of 55-year-old man whose blood sample showed abnormal serum separation despite centrifugation. Repeated blood sampling also showed a similar outcome. A 55 year old man presented with anaemia and hypercalcaemia with constitutional symptoms. Therefore, multiple myeloma was suspected. Blood sample was sent in serum separator gel tube for serum protein electrophoresis (SPE). It was noted that barely any serum after centrifuge. Repeated blood sample was done to exclude gel or tube defect by any chance, however still unable to obtain any serum. Analysis of total protein using plasma sample sent in lithium heparin tube showed marked elevation of 117 g/L. As an alternative, we advised the clinician to repeat the blood sample for SPE in plain tube, and serum was separated successfully. Serum protein electrophoresis and immunofixation revealed IgG kappa paraproteinemia with immune paresis consistent with bone marrow and free light chain findings. Rarely protein can cause unusual serum separation and significant interference in the laboratory assay analysis. Careful inspection of the sample in serum separator gel tubes should be done before analysis if highly suspicious of M protein interference, which is evidenced by abnormal serum separation.

**Hypokalaemia in Severely Haemolysed Sample**

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Haemolysis is a frequent cause of sample rejection in laboratories due to its impact on result accuracy. *In vivo* haemolysis, though rare and harder to distinguish from *in vitro* haemolysis due to subtle serum colour, should not automatically lead to sample rejection. A 50-year-old woman with hypertension and diabetes presented with abdominal pain, lethargy, vomiting, and cough. She was dehydrated, hypertensive, and tachycardic. Initial tests revealed high ketone and glucose levels, alongside metabolic acidosis, leading to a diagnosis of diabetic ketoacidosis (DKA) secondary to community-acquired pneumonia (CAP). Laboratory samples were initially rejected due to severe haemolysis, and a repeated sample half an hour later also showed gross haemolysis. Analysis of sample revealing hypokalemia (2.9 mmol/L) with a haemolysis index of 9+. Other results included elevated LDH (3347 U/L), low haemoglobin (6.1 g/L), elevated reticulocytes (4.4%), high total bilirubin (22.3 µmol/L), and a positive Direct Coombs test, suggesting in vivo haemolysis. The result was validated and released. The haemolysis index of subsequent samples was normalised after four days. In vivo haemolysis is rare, occurring in about 3.2% of haemolysed samples. Unlike *in vitro* haemolysis, which can result in falsely elevated potassium levels, *in vivo* haemolysis usually maintains normal serum potassium levels due to the body's regulatory processes. Hypokalaemia in this case was attributed to intracellular potassium shifts, renal and gastrointestinal losses, and acidosis. For a patient with *in vivo* haemolysis, test results reliably indicate their actual condition. Adhering to proper laboratory protocols for handling Haemolysed samples is crucial to avoid unnecessary rejections and provide appropriate patient care.

**Complex Glycerol Kinase Deficiency in Xp21 Contiguous Gene Deletion Syndrome: An Unusual Cause of Salt'a'**

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Complex glycerol kinase deficiency (CGKD) (OMIM: 300679) is an X-linked recessive Xp21-contiguous gene deletion syndrome caused by multiple microgenes deletions. It is characterised by adrenal hypoplasia, glycerol kinase deficiency, Duchenne muscular dystrophy (DMD) and intellectual disability. A 7-year-old boy presented with gross motor delay, progressive difficulty climbing stairs and proximal myopathy since 3 years old. On examination, he was hypotonic with lumbar lordosis and bilateral calf pseudohypertrophy. He demonstrated waddling gait with positive Gower's sign. His high creatine kinase led to diagnosis of DMD and was started on steroids. His 3-year-old younger brother presented with gastroenteritis and scrotal hyperpigmentation in the neonatal period raising the suspicion of adrenal dysfunction. No hypoglycaemic and virilisation features were noted. Laboratory findings showed hyponatremia, hyperkalaemia, elevated ACTH/Renin, hypocortisolism, hypoaldosteronism and normal 17-hydroxyprogesterone. He was treated for adrenal insufficiency with steroids. At 10 months, he developed delayed speech, gross motor impairment, hypertransaminitis, high creatine phosphokinase and hypertriglyceridemia. In view of pseudohypertriglyceridemia, urine organic acids analysis using Gas Chromatography-Mass Spectrometry (GCMS) demonstrated marked glyceroluria which confirmed the diagnosis of CGKD. Genetic investigations revealed Xp 21.1-21.2 deletion shared among both siblings. Combining the evidence of DMD, CGKD and adrenal hypoplasia, the diagnosis of Xp21 contiguous gene deletion syndrome was made. This case report highlights the importance of multidisciplinary evaluation of early diagnosis of CGKD that could provide optimal multi-profile medical care and quality of life. Hyperglyceroluria using GCMS is an effective detection method to supplement the diagnosis of Xp21 gene deletion syndrome.

**Case Report: Addressing False Positives in Intraoperative PTH Measurement**

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Intraoperative parathyroid hormone (IOPTH) measurement is the gold standard for focused parathyroidectomy, minimising postoperative complications. However, several factors may contribute to false results, leading to unsuccessful removal of hyperfunctioning parathyroid tissues. A 55-year-old woman presented with a one-month history of abdominal discomfort and constipation. Laboratory investigations revealed persistent hypercalcaemia, elevated parathyroid hormone level with normal thyroid and renal function tests, hence raising suspicion of primary hyperparathyroidism. Imaging studies, including ultrasound and Tc-99m sestamibi scintigraphy, identified a multinodular goitre. However, no hyperfunctioning parathyroid gland was detected. The patient underwent a total thyroidectomy and removal of parathyroid adenoma. The excision was guided by a 50% reduction in parathyroid hormone levels intraoperatively after removing all 4 parathyroid glands, with a presumed complete excision. However, postoperatively, hypercalcaemia persisted. Further evaluation revealed a residual functioning left parathyroid adenoma. A second parathyroidectomy was performed, resulting in more than 50% reduction in IOPTH level at 5 minutes post-excision, resolving hypercalcaemia and confirming successful adenoma removal. IOPTH testing mandates a 50% PTH reduction 5 minutes post-excision based on Miami criteria, with 95% accuracy. False positive results may arise from delayed sample separation and processing, extreme temperature exposure, haemolysis, or sample dilution. In this case, dilution is highly suspicious in view of arterial line sampling, leading to false reduction of first IOPTH measurement. Discarding the initial blood withdrawal and proper sampling from arterial or venous access are necessary to ensure the accuracy of PTH level intraoperatively. Proper sampling of IOPTH determines the accuracy of PTH level and eventually, prevents false positives to ensure effective surgical outcomes.

**Serum Glutamate-Pyruvate Transaminase (SGPT) Elevation following Cholinesterase Level Reduction in Organophosphate Pesticides Exposure**

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Involvement in pesticide space spraying (fogging) activities for management of dengue outbreaks submits vector operators towards occupational exposure related to hazardous organophosphate compounds. Hence, this case report study was aimed to discuss on cholinesterase level reduction and Serum Glutamate-Pyruvate Transaminase (SGPT) elevation in vector operators following Organophosphate Pesticides (OPPS) exposure during fogging activity. OPPS post-exposure serum samples of vector operators were sent to Johor Bahru Public Health Laboratory (JBPHL) after the last fogging activities. The samples were analysed for Cholinesterase Test and Liver Function Test using Automated Chemistry Analyser Beckman Coulter AU480. Out of 9 cases of low Cholinesterase levels, 5 (56%) cases have shown an increase in SGPT levels. Exposure to OPPS even in a short term could inhibit the activity of cholinesterase enzymes leading to the reduction of Cholinesterase level. Impaired liver function due to OPPS exposure could be observed from the enzymes that were excreted by the liver cells (hepatocytes) into the blood such as Serum Glutamic Pyruvic Transaminase (SGPT), Serum Glutamic Oxaloasetic Transaminase (SGOT) and Alkaline Phosphatase (ALP). For this case study, the results have shown an increase in SGPT level with Cholinesterase level reduction following OPPS exposure. This case study highlights the toxic potential of pesticides on human health and their biological consequences, which require an increase in consciousness of the precautions imposed on their use. However, further studies with a larger number of samples and other related variables are recommended.

**Poster Presentation: Haematology**

**Trapped Within: Unmasking a Case of Intravascular Large B-Cell Lymphoma**

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Intravascular large B-cell lymphoma (IVLBCL) is a rare and aggressive subtype of lymphoma characterised by the selective growth of malignant lymphocytes within the lumina of blood vessels. Due to its non-specific clinical presentation, IVLBCL often poses significant diagnostic challenges. We present a case of IVLBCL emphasising more on the morphological findings. A 49-year-old lady presented with generalised seizures and reduced consciousness. No organomegalies or lymphadenopathies detected. Frontal release signs were elicited on neurological examination. Additional laboratory investigations were inconclusive. MRI brain was suggestive of encephalitis and she was treated as such. However, few weeks later, she was readmitted for similar symptoms. Full blood picture showed bicytopenia (anaemia and thrombocytopenia) with 4% abnormal lymphoid cells. Serum LDH was markedly raised. Bone marrow aspirate revealed some suspicious looking abnormal mononuclear cells. Trephine biopsy showed abnormal lymphoid cells filling up the entire vascular space (cohesive growth pattern) and intrasinudoidal with extravasation infiltrative pattern. They are positive for pan-B-cell markers and high Ki-67 proliferative index leading to a diagnosis of IVLBCL. This case demonstrates the rare type of IVLBCL. The malignant cells can be confined to the vascular spaces as in our case, free floating or exhibits a marginating growth pattern. Mostly, the cells have pure intrasinusoidal infiltrative pattern but certain cases can show

extravasation as seen in our patient. Immunohistochemistry is crucial in aiding the diagnosis. These peculiar growth patterns make IVLBCL challenging to diagnose due to its subtle histopathological appearance, requiring additional ancillary studies for accurate diagnosis.

**Heterozygous Hereditary SEA Ovalostomatocytosis (SAO) Causing Haemolysis and Inspissated Bile Syndrome.**

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Southeast Asian Ovalostomatocytosis (SAO) is an autosomal dominant disorder caused by the deletion of 9 codons in the gene for band 3(*SLC4A1*). SAO may present with neonatal haemolytic anaemia and typically resolves within 3 years. This is a case of SAO with haemolysis, first manifesting at infancy. 2-month-old Orang Asli child, born full term with BW 2.29 kg and no history of neonatal jaundice or previous admissions, presented with pallor, jaundice and hepatomegaly. Investigations upon admission showed Hb 6.4 g/dl (normal MCV, MCH), Platelet 462 × $10^9$/L, WBC 22.8 × $10^9$/L, reticulocytes 7.79%.FBP revealed typical SAO morphology with haemolysis. Liver function was significantly deranged with elevated ALT, AST, ALP, GGT, LDH and total bilirubin (predominant direct form). Screening for G6PD, Inborn Error of Metabolism (IEM), TORCHES, Direct Coombs Test and iron profile were within normal limits. Mother's and child's blood grouping is Group B RhD Positive. Both parents' smears exhibit SAO without haemolysis. Molecular analysis for child and both parents reported as Heterozygous SAO Band 3 deletion identified. No evidence of biliary atresia or choledochal cyst was noted on ultrasound. Child was diagnosed with Inspissated Bile Syndrome though not supported by radiological findings, likely caused by underlying haemolytic anaemia. She was started on Ursodeoxycholic acid and jaundice recovered, with normal liver function test and Hb of 10.1g/L. This case highlights possibility of severe anaemia with secondary complication in SAO trait and importance of identifying haemolysis from blood smears during diagnostic process. Availability of molecular study for SAO is useful for genetic counselling and future management of the patient.

**Haemoglobin α2 Codon 15 (-G + CC): First Report of Hb H Disease in a Compound Heterozygous Patient.**

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Haemoglobin α2 Codon 15 (-G + CC) mutation is a novel alpha variant thalassemia. This is an indel mutation that involves deletion of G nucleotide and insertion of two C nucleotides into codon 15 in exon 1 of the *HBA2* gene. Initially identified in a Malay lady with mild hypochromic microcytic anaemia, this mutation has now been observed in a second case involving a compound heterozygous state with alpha zero thalassaemia, resulting in Hb H disease. A previously healthy Chinese man presented with fever and dizziness. He was admitted to the hospital following a positive serology test for dengue fever. He has a family history of anaemia and no prior history of blood transfusion. On physical examination, he exhibited pallor and had hepatosplenomegaly. His full blood count revealed a haemoglobin level of 4.9 g/dl, with mean corpuscular volume (MCV) of 64 fl, mean corpuscular haemoglobin (MCH) of 18.5 pg, and a red cell distribution width (RDW) of 23%. The peripheral blood film showed marked anisopoikilocytosis, and some fragmented cells. Low HbA2 levels were found by capillary electrophoresis (CE) and high-performance liquid chromatography (HPLC), which account for 0.8% and 1.3% of the total Hb. An anomalous peak in CE, seen at 18.1%, suggested the presence of Hb H. Molecular testing using alpha Multiplex Gap identified a heterozygous SEA deletion, and subsequent sequencing revealed homozygosity for α2 codon 15 (-G + CC) and α2 codon 137 (ACC>ACT) variations. Haemoglobin α2 Codon 15 (-G + CC), a rare alpha variant of haemoglobin, was initially discovered during a thalassemia screening programme. This indel mutation causes a frameshift, resulting in a shortened α-globin chain with a stop codon at codon 16 (AAG>TAA). Despite this, the alteration does not give rise to important clinical manifestations in heterozygous individuals. This is the first description of Hb H disease caused by a combination of α0-thalassemia with Hb α2 Codon 15 (-G + CC) in the Malaysian population. Based on the phenotypic features and the mutational effects of this variant, we propose classifying it as pathogenic variant. Characterizing such variant is crucial for advancing genetic counseling and prenatal diagnosis.

**Interaction of Haemoglobin Adana with Single Alpha Gene Deletion: 8 years Data from Northern Molecular Thalassaemia Diagnostic Centre Peninsular Malaysia.**

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Haemoglobin (Hb) Adana is an Alpha (α) thalassaemia variant due to mutations in α1- or α2-globin codon 59 (αCD59) which is commonly found in the Malay ethnic. In this case series, we studied the interaction of Hb Adana with single α gene deletion based on clinical presentation, haematological parameters, Hb typing and transfusion requirement. We retrospectively collected data from all samples categories from March 2016 to December 2023 through Laboratory Information System (LIS) using DNA

national coding systems namely CH1AD ($\alpha\alpha^{CD59}/-\alpha^{3.7}$) compound heterozygous α plus 3.7 kb deletion with Hb Adana and CH2AD ($\alpha\alpha^{CD59}/-\alpha^{4.2}$) compound heterozygous α plus 4.2 kb deletion with Hb Adana. FBC were performed using various analysers meanwhile Hb typing using Capillary Zone Electrophoresis (CZE) and High-Performance Liquid Chromatography (HPLC). Multiplex Gap PCR and multiplex ARMS PCR were used to detect deletional and common non-deletional α-thalassaemia, respectively. A total of 25 cases showed CH1AD ($\alpha\alpha^{CD59}/-\alpha^{3.7}$) and no sample of CH2AD ($\alpha\alpha^{CD59}/-\alpha^{4.2}$) identified. Three cases showed co-inheritance with heterozygous Hb E. 24% of CH1AD shows mild anaemia with mean Hb 10.8±0.6g/dL, MCV 69.8±5.6fL, MCH 22.0±1.3pg. 56% of cases shows moderate anaemia with mean Hb 8.8±0.6g/dL, MCH 24.6±2.9pg, MCV 76.1±8.7fL and 20% of cases shows severe anaemia with mean Hb of 6.6±0.8g/dL, MCH 23.1±2.4pg and MCV 76.4±8.6fL. Four adult patients presented with more severe phenotypes and one 10-month-old baby was diagnosed and became a non-transfusion dependent thalassemia patient. This case series highlights the phenotypic variability of these interactions in which the management should be tailored individually.

**Unveiling The Silent Vampire as A Culprit for Unexplained Severe Anaemia in Post Renal Transplant Recipient.**

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Anaemia in post-renal transplant patients may increase morbidity and mortality rates. One known cause of post-transplant anaemia is parvovirus B19 (PVB19) infection. A 42-year-old man with end-stage kidney disease underwent a deceased donor renal transplant. Pre-transplant, his haemoglobin was 11.8 g/dL. During the clinic follow-up, it was noted that his haemoglobin gradually decreased and on day 82 post-transplant, he developed symptomatic anaemia with a haemoglobin level of 5.2 g/dL, WBC of $5.98 \times 10^3$/uL, platelets of $376 \times 10^3$/uL and significant reticulocytopenia (reticulocyte count of 0.15%). A peripheral blood smear revealed severe normochromic normocytic anaemia. Other causes of anaemia including adverse drug effects, bleeding, haemolysis, and nutritional deficiency had been ruled out. Due to persistent anaemia of unknown cause despite frequent blood transfusions, bone marrow aspiration was done and revealed suppression of isolated single-lineage haematopoiesis, specifically erythropoiesis, with indistinct morphological abnormality of intranuclear inclusions within the proerythroblasts. Trephine biopsy showed marked suppression of mature erythropoiesis with the presence of giant early proerythroblasts that were positive for parvovirus staining. The parvovirus polymerase chain reaction (PCR) test result, which came back later, was positive. He was treated with IV immunoglobulin for 5 days, and haemoglobin levels gradually increased to 10.4 g/dL in 1 month without the further need for packed cells transfusion. In immunocompromised patients, serology test for parvovirus may yield negative results due to a delayed and inadequate antibody response. PCR can enhance the detection of PVB19 infection, but it is not widely available. Therefore, bone marrow aspiration and trephine biopsy can aid in early diagnosis through the morphological findings and immunohistochemistry staining, thereby improving patient outcomes.

**Surviving Homozygous South East Asia Ovalocytosis: Early Detection and Long Term Complication**

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South East Asian Ovalocytosis (SAO) is an autosomal dominant hereditary defect in red blood cell (RBC) membranes caused by codons 400-408 deletion which codes for band 3, results in mutations of the anion exchanger 1 (AE1), affecting the RBC membrane's anion transport function. The mutations also cause distal renal tubular acidosis (dRTA) due to disrupted anion-transport activity in kidney. We report two cases of live-born homozygous SAO. A girl and a boy both delivered at 33 weeks, were diagnosed with hydrops foetalis at 26 and 24 weeks respectively, due to severe foetal anaemia requiring intrauterine transfusions. Both were born with severe anaemia (6.2 g/dl and 8.2 g/dl). Their full blood pictures showed spherocytes, nucleated RBCs, and polychromatic cells suggestive of haemolysis. Molecular studies confirmed band 3 deletions. After birth, both underwent multiple exchange and blood transfusions for severe neonatal jaundice due to haemolysis and also treated for dRTA due to persistent metabolic acidosis (venous blood gases show consistently low pH level, below 7.3 with bicarbonate value persistently below 20). They were discharged home and currently thrive (age 19 and 5 months respectively), yet require monthly blood transfusions, keeping the Hb level above 9g/dL and on daily syrup sodium bicarbonate. In the past, homozygous SAO was considered fatal, but advancements in prenatal care now yield survivors. However, the outcome is poor as they become transfusion-dependent since birth with other comorbidity. Implementing a screening, prevention, and control programme for homozygous SAO is crucial to prevent its escalation into a major health crisis.

**Unexpected Finding of a Soft Tissue Myeloid Sarcoma in a Newly Diagnosed Chronic Myeloid Leukaemia in Chronic Phase**

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Chronic myeloid leukaemia (CML) is a slow-growing type of malignancy that originates from an abnormal proliferation of haematopoietic pluripotent stem cells caused by t(9;22) translocation leading to *BCR::ABL1* fusion gene. CML could progress into

the medullary blast phase (CML-BP) or extramedullary manifested as myeloid sarcoma (MS). Herein, we report an unusual case of a newly diagnosed CML with medullary chronic phase (CML-CP) and coexisting findings of extramedullary MS. A 25-year-old gentleman presented with abdominal pain, splenomegaly and lymphadenopathy. His blood investigation showed hyperleukocytosis with white blood cell count of $270.1 \times 10^9$/L, haemoglobin of 8.5 g/dL and platelet count of $578 \times 10^9$/L. Peripheral blood film showed hyperleukocytosis with peaks in the proportion of neutrophils and myelocytes with the presence of 4% blasts, suggestive of CML. Bone marrow aspirate was dry tap. Trephine biopsy showed granulocytic hyperplasia with no excess of blasts (<5%). Molecular and cytogenetic analysis confirmed the diagnosis in which Major *BCR::ABL1* fusion transcript and presence of Philadelphia (Ph) chromosome were detected. To our surprise, his inguinal lymph node biopsy revealed evidence of myeloid sarcoma as evidenced by diffuse positivity to CD34, MPO and CD117 immunohistochemistry stain with high proliferative index (> 90%). His new revised diagnosis was chronic myeloid leukaemia in the blast phase. Limited literatures suggested that MS in CML with medullary CP confer a better prognosis than in BP. However, MS could also be the first sign of blast phase transformation thus an early evaluation of MS among CML patients is essential for best treatment decision.

**Unveiling A Case of Suspected Neonatal Alloimmune Thrombocytopenia: Uncommon Platelet Reactive Antibody**

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Neonatal alloimmune thrombocytopenia (NAIT) is a potentially life-threatening condition characterised by maternal alloantibodies targeting foetal platelet antigens, leading to severe thrombocytopenia in the neonate. Here we report a case of a baby boy on his fourth day of life, initially admitted for neonatal jaundice and an incidental finding of severe thrombocytopenia (platelet count $2 \times 10^3$/uL) with no bleeding tendencies. Intravenous immunoglobulin (IVIG) was administered on the sixth day of life, and the platelet count subsequently increased to $72 \times 10^3$/uL. No platelet transfusion was needed. The patient was discharged well, and subsequent platelet counts returned to normal ($356 \times 10^3$/uL) at day 40 of life. Platelet immunology testing at the National Blood Center revealed a strong reaction at GP IIb/IIIa, showing significant incompatibility on parental crossmatch. Maternal autoantibodies were negative. Human platelet antigen (HPA) genotyping showed a discrepancy at allele 3bb where the father was 3aa and the baby was 3ab. However, anti-HPA 3a was not detected. NAIT with uncommon platelet reactive antibody was suspected. Platelet crossmatch incompatibility suggested alloimmune thrombocytopenia. Additionally, the favourable response and recovery of the platelet count after IVIG administration supported the immune nature of thrombocytopenia. Further gene sequencing at an international reference laboratory was suggested for confirmation. This report describes a case with severe thrombocytopenia that could be overlooked due to initial asymptomatic presentation. While platelet antigen studies and gene sequencing may not be available in every laboratory, prompt clinical suspicion is imperative for enhancing patient outcomes and averting severe bleeding complications.

**The Critical Role of Trephine Biopsy in Diagnosis: A Case Series of Hepatosplenic T-Cell Lymphoma in Hospital Kuala Lumpur**

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Hepatosplenic T-cell lymphoma (HSTCL) is a rare, aggressive form of peripheral T-cell lymphoma, characterised by cytotoxic T-cell proliferation exhibiting a sinusoidal infiltration pattern in the spleen, liver, and bone marrow. Patients are typically present with B symptoms, cytopenias and hepatosplenomegaly without lymphadenopathy. Two cases of hepatosplenic T-cell lymphoma were encountered from trephine biopsies involving a 57 year old lady and a 37 years old gentleman. Both presented with B symptoms. Clinical examination and radio imaging showed hepatosplenomegaly but no lymphadenopathy. Both cases had anaemia and thrombocytopenia with no absolute lymphocytosis. The bone marrow aspirate smears from both cases were suboptimal with few haemophagocytosis observed in the first patient. The trephine biopsies showed presence of intrasinusoidal infiltration of abnormal T lymphoid cells in the background of myeloid and erythroid hyperplasia. These cells were small to intermediate in size with clumped nuclear chromatin pattern, inconspicuous nucleoli; and positive for CD3 and CD7. First patient displayed positive TIA-1 but negative CD8. For second patient, CD8 showed heterogeneous weak positivity and negative TIA-1. Both patients tested negative for CD4, CD5, CD56, Epstein-Barr encoded region (EBER) in situ hybridization and TdT. Bone marrow involvement by HSTCL is common when trephine biopsies are carefully investigated. There is predominantly sinusoidal infiltrate composed of atypical small to medium-sized lymphoid cells forming aggregates within the sinuses. The neoplastic cell infiltration is often subtle and may be difficult to recognise in routine haematoxylin-eosin-stained sections; immunohistochemistry is often required for its demonstration of the intrasinusoidal T lymphoid cells infiltration.

**Hb Q Thailand vs Hb San Jose: Diagnostic pitfall and case series**

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Haemoglobin (Hb) Q-Thailand is an alpha variant with risk of thalassaemia intermedia if compound heterozygous with alpha zero thalassaemia. Whereas HbG-San Jose is a benign beta variant and reported as normal phenotype in homozygous state. Both

variants manifest similar amount and pattern on Hb analysis causing diagnostic confusion. We demonstrate unique features of HbQ-Thailand as opposed to HbG-San Jose. Five cases were reported, including three with HbQ-H disease, one with heterozygous HbQ-Thailand, and one with HbG-San José. Two of the HbQ-H cases were investigated for anaemia, while the others were identified through screening programme. All cases showed hypochromic microcytic red blood cells, with presence of Hb variant at zone 7 on capillary electrophoresis (CE) and S window on High Performance Liquid Chromatography (HPLC) amounting ~29-30% for heterozygous and ~ 89-95% for compound heterozygous state. All cases with Hb Q-Thailand have additional HbA2 variant peak, and for HbQ-H cases have additional HbH identified. These two variants migrate to the same positions on Hb analysis with ~30% haemoglobin in the heterozygous state. Though, an alpha variant is expected to have <25% in heterozygous state, HbQ-Thailand is linked to 4.2kb alpha deletion, affecting two alpha genes, causing higher percentage of the variant. In contrast to Hb-G San José, HbQ-Thailand also has additional peak of HbA2 variant and unique pattern on Hb analysis. Knowledge of the characteristics of Hb variants allows for correct presumptive diagnosis from Hb analysis, facilitating counseling when molecular analysis is unavailable.

**Lineage switch from Acute Myeloid Leukaemia to Mixed Phenotype Acute Leukaemia: A Rare Case Report.**

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Lineage switch in acute leukaemia is rare and it poses diagnostic and therapeutic challenges to both pathologists and clinicians. Here, we report a rare case of acute myeloid leukaemia (AML) during initial presentation and transformed into mixed-phenotype acute leukaemia (MPAL) during relapse. A 52-year-old male was diagnosed with AML, intermediate risk in 2022. Molecular analysis showed FLT3-ITD and wild-type NPM1 mutation. He achieved morphological remission with chemotherapy but defaulted to follow-up since then. Two years later, he presented with fever, cervical lymphadenopathies and a left parapharyngeal mass. Bone marrow aspirate showed >80% blast with 2 distinct populations. Trephine revealed a sheet of blast that expressed myeloid and T cell markers correlating with immunophenotyping (IPT) findings. There were no molecular or cytogenetic abnormalities. A diagnosis of MPAL, T/Myeloid was then established. To date, the transformation of AML into MPAL is rare worldwide with few cases reported. The diagnosis of MPAL is challenging and requires the integration of IPT and molecular techniques. For this case, the immature cells in MPAL exhibit features of myeloblast and lymphoblast, making an initial diagnosis by morphological assessment and cytochemical stains difficult. The blast cells also may lose or gain expression of several antigens during relapse. Therefore, extensive IPT is required to achieve the right diagnosis. MPAL should be considered as a differential diagnosis in relapse AML. Further studies are required to understand the mechanism of lineage switch to improve the risk stratification and management strategy for the near future.

**Molecular Cytogenetics Unveil a Rare Variant Philadelphia Chromosome in Chronic Myeloid Leukemia: A Case Report**

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Molecular cytogenetics plays a crucial role in modern medicine, allowing for the precise identification of genetic abnormalities that underlie various diseases. The t (9,22) translocation, known as the Philadelphia chromosome, is a hallmark genetic abnormality in Chronic Myeloid Leukemia (CML), resulting in the *BCR::ABL1* gene fusion. However, 5-10% of cases may present with variant translocations involving additional chromosomal rearrangement beyond 9 and 22. A 70-year-old man with no prior medical conditions presented with abdominal pain, vomiting, and diarrhea but no other significant symptoms. Physical examination shows no obvious organomegaly. Full blood count showed leucocytosis of WBC 62.5 × $10^3$/uL with haemoglobin level of 11.6 g/dL and platelet at 265 × $10^3$/uL. The peripheral blood smear showed a bipeak pattern of neutrophilia, myelocytes and the presence of 2% blast cells. Bone marrow examination showed hypercellularity with increased granulopoiesis and less than 1% blast cells, suggesting CML in the chronic phase. Cytogenetic karyotyping analysis revealed a 46, XY chromosome pattern with t(11;22) (q23;q11.2). Fluorescence in situ hybridization (FISH) showed positive fusion signal of *BCR::ABL1* gene on derivative of chromosome 22. Molecular analysis using real-time polymerase chain reaction (PCR) revealed a major *BCR::ABL1* fusion transcript. Identifying variant Philadelphia translocations is crucial for a complete genetic profile of CML. Molecular cytogenetic techniques are indispensable in the comprehensive evaluation of variant Philadelphia translocations in CML. They provide detailed insights into the genetic complexity of the disease, which is crucial for diagnosis, treatment planning, and understanding the potential implications for patient outcomes.

**The Hidden Culprit: Chronic Lymphocytic Leukaemia with Lack of Surface and Cytoplasmic Immunoglobulin Light Chains**

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Clonal B-lymphoproliferative disorder (B-LPD) usually expresses surface immunoglobulin (sIg) light chains restriction. However, some may have lack of sIg light chains thus making it diagnostically challenging to prove clonality. We highlight a very rare case of chronic lymphocytic leukaemia (CLL) with absence of both surface (sIg) and cytoplasmic immunoglobulin (cIg) light chains restriction. A 74-year-old male was incidentally found to have persistent lymphocytosis (5.3-7.5 × $10^9$/L) and eosinophilia (1.2-4.4 × $10^9$/L) for three years. Haemoglobin and platelet counts were normal. Lymphadenopathy or hepatosplenomegaly were absent. The peripheral blood film showed medium-sized lymphocytes exhibiting moderate amount of cytoplasm, clumped chromatin pattern with inconspicuous nucleoli. Some smudge cells were seen. Immunophenotyping of peripheral blood and bone marrow aspirate revealed ~96% of the B-cell population was positive for CD19, CD20, CD5, CD23 and CD200. They were negative for FMC7, CD123, CD3, CD10, CD56, nTDT and CD34, in favour of CLL. However, there were lack of both surface and cytoplasmic kappa and lambda light chains. Mature B-cell lymphomas lacking sIg and cIg have been observed, albeit very rarely. A thorough review of the literature revealed no instances of reactive lymphoid hyperplasia or lymphocytosis with a total absence of cIg light chain, although sIg alone might be absent. Thus, the absence of both sIg and cIg in mature B-cells may serve as a reliable surrogate marker for clonality/neoplastic determination, provided comprehensive investigations have been undertaken. Performing monoclonal sIg and cIg preferably with polyclonal antibodies may help to recognise this otherwise obscured clonal population.

**Composite Lymphoma: A Rare Case of Concurrent Burkitt and Mantle Cell Lymphomas with CNS Involvement in Sabah**

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Composite lymphoma (CL) is characterised by two or more distinct lymphoma subtypes within a single anatomical site. This case report details a 42-year-old male diagnosed with a composite lymphoma consisting of Burkitt lymphoma (BL) and mantle cell lymphoma (MCL), a rare combination with limited prior documentation. He presented with abdominal discomfort, night sweats, cranial nerve palsies, splenomegaly, and lymphadenopathy. Blood tests revealed a high white blood cell count with abnormal lymphoid cells. Flow cytometry identified two populations of abnormal B-lymphoid cells: one expressing CD5+/CD10- with Lambda light chain restriction, and the other expressing CD5-/CD10+ with Kappa light chain restriction. Trephine and lymph node biopsies confirmed a composite lymphoma diagnosis, showing distinct immunophenotypic profiles: Cyclin D1 and SOX11 positivity for mantle cell lymphoma (MCL), and c-MYC and CD10 positivity with BCL2 negativity and high Ki67 (>95%) for Burkitt lymphoma (BL). Fluorescent in situ hybridization (FISH) analysis revealed the coexistence of CCND1/IGH and MYC rearrangements, consistent with MCL and BL diagnoses, respectively. Imaging showed secondary central nervous system (CNS) involvement. A thorough flow cytometry analysis helps identify various lymphoma subtypes in this case. Additionally, immunohistochemistry and genetic analysis are essential for distinguishing the specific lymphoma components. This case underscores the uncommon instance of composite lymphoma, necessitating a comprehensive approach to achieve a definitive diagnosis and ultimately inform effective treatment strategies for these complex malignancies.

**Bone Marrow Involvement in Cardiac Amyloidosis: A Case Report**

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Amyloidosis is characterised by abnormal deposition of misfolded proteins in beta-pleated sheet structure in various tissues leading to progressive organ failure. Very often, in patients with tissue amyloidosis, bone marrow examination is performed to exclude secondary amyloidosis by plasma cell myeloma. A 71-year-old man with multiple comorbidities, presented with heart failure symptoms and was diagnosed with ATTR cardiac amyloidosis. Clinically, there is no hepatosplenomegaly. Blood film shows mild thrombocytopenia with no leucoerythroblastic picture. No monoclonal paraprotein detected on protein electrophoresis with normal free light chain ratio. Bone marrow aspirate is unremarkable. Trephine biopsy demonstrates normocellularity with adequate trilineage haematopoiesis. Plasma cells are not increased, with equivocal light chain expression. Patchy pink amorphous amyloid deposits noted, characterised by apple-green birefringence on congo red stain under polarized light, consistent with marrow involvement by amyloidosis. Two forms commonly affect the heart, immunoglobulin light chain amyloidosis (AL) and transthyretin amyloidosis (ATTR). AL, an acquired disease associated with monoclonal plasma cell that produces abnormal light chains which aggregate, forming insoluble fibrils. ATTR, misfolding of transthyretin due to either inherited destabilizing variants (ATTRv) or ageing (ATTRwt). Accurate amyloid typing is crucial for patient management as treatment regimen varies. AL is rapidly progressive and requires chemotherapy to halt amyloidogenic light chain production. Whereas, ATTR progresses slowly and requires targeted therapy such as selective TTR stabilizer. However, recent studies revealed that marrow involvement by ATTR may represent advanced-stage disease. This case illustrates the significance of bone marrow assessment in cardiac amyloidosis.

**Double the Trouble A Case of Dengue Fever and Concurrent Acute Myeloid Leukaemia (AML)**

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Dengue fever is a vector-borne disease that has significantly increased in prevalence worldwide. In Malaysia, the incidence of dengue fever has been rising since 2020, with the highest number of cases reported in 2023. Acute myeloid leukaemia (AML), the most common form of acute leukaemia in adults and becomes increasingly common with age. We hereby present a case of dengue fever occurring concurrently with AML in district hospital Sabah. A 79-year-old gentleman with an underlying hypertension and dyslipidaemia presented with fever for two days, epigastric pain, vomiting and loose stool. Otherwise, no bleeding tendency. Dengue rapid test positive for IgM and IgG with NS1 negative. Patient was initially treated for dengue fever and gram-negative sepsis. Daily FBC monitoring shows bicytopenia with drastic increased of TWC from 29.7 (day 1) to 58.8 (day 2) and the highest was 92.99 (day 4). Peripheral blood film was sent and revealed 97% blasts. Immunophenotyping from peripheral blood was done and diagnosis of AML was established. However, due to age-related considerations, patient declined bone marrow aspiration and trephine biopsy, as well as chemotherapy, instead opted for conservative management. Leucopenia and thrombocytopenia are typically observed in dengue fever. However, in some cases, leukocytosis may occur due to secondary bacterial infections. AML is typically characterised by leukocytosis, anaemia, and thrombocytopenia. Given the overlap in clinical presentations, a high index of suspicion for malignancy should be considered in dengue fever cases presenting with leukocytosis. Early diagnosis is crucial for timely clinical intervention and reducing mortality.

**Poster Presentation: Medical Microbiology**

**A Fitting Manifestation of *Oligella urethralis* Bacteraemia**

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*Oligella urethralis* is an oxidase-positive, non-fermenting, gram-negative organism of low virulence. Previously known only as a human genitourinary tract commensal, this bacterium has been of growing pathogenic significance in immunocompromised patients. Among the few reported cases of *O. urethralis* infections, almost all patients recovered, as the organism is susceptible to multiple antibiotics. We report a case of fatal *O. urethralis* bacteraemia manifested by status epilepticus in a relatively immunocompetent patient. Elderly, diabetic gentleman was brought in by ambulance due to gradual decrease in responsiveness over the past day, accompanied by generalised myalgia for two days. He was unresponsive, in haemodynamic shock, and lost gag reflex. His Glasgow Coma Scale persistently reduced on the second day of admission following a convulsion episode in the ward, after which he was intubated. A blood culture taken on the second day of admission grew *Oligella urethralis*, which was identified via MALDI-TOF and confirmed with 16S rRNA sequencing. Antibiotic sensitivity test revealed the isolate was sensitive to cefepime, ceftazidime, and piperacillin-tazobactam. Urine, cerebrospinal fluid, and tracheal aspirate cultures were negative. Despite being treated for six days with effective antimicrobial agents, the patient succumbed to sepsis with multi-organ failure. Seizure manifestations have never been reported due to the rarity of *O. urethralis* infections. Despite its generally low virulence and good response to antimicrobial agents, *Oligella urethralis* infections should not be taken lightly, as there are cases with aggressive manifestation resulting to fatal consequences.

**Breaking New Ground: First Tissue Isolation of *Kalamiella piersonii* and Its Clinical Implications**

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*Kalamiella piersonii* is a newly discovered gram-negative bacterium, first isolated from the International Space Station. Recently proposed for reclassification as *Pantoea piersonii* comb. nov. this motile, non-fermenting gram-negative Enterobacterales belongs within the Erwiniaceae family. It has been isolated from human saliva, urine and blood, posing an opportunistic pathogen in both immunocompromised and immunocompetent host. This case report describes the first instance of *K. piersonii* isolated from a tissue specimen in the country. A 32-year-old man, newly diagnosed with advanced retroviral disease (RVD) and hepatitis B, presented with fever, chills and generalised rashes for a week. Examination revealed a dry scab lesion on the right wrist. Excision biopsy was performed and tissue sample was sent for culture. A non-haemolytic, non-lactose fermenting colony was isolated on blood and MacConkey agar. Matrix-assisted laser desorption ionisation-time-of-flight mass spectrometry (MALDI-TOF MS) identified the organism as *Kalamiella piersonii* with a log score of 2.23, confirmed via 16S rRNA gene sequencing. Antibiotic susceptibility, which was determined using CLSI M100 Enterobacterales breakpoints revealed as AmpC-producer. Misidentification of *K. piersonii* is common due to its similar biochemical characteristics to other Pantoea species such as *P. agglomerans, P. septica* or even *Salmonella*. This may cause its prevalence underestimated. *K. piersonii* can acquire multiple drug resistance mechanisms, including efflux pump systems and chromosomally encoded beta-lactamase genes, leading to resistance against penicillins and cephalosporins, as observed in our isolate. MALDI-TOF proves to be a reliable diagnostic modality in identifying rare gram-negative species causing human infections.

**_Vibrio cholera_ Non-O1/Non-O139 and Rotavirus acute gastroenteritis: a rare co-infection case report.**

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*Vibrio cholerae* belongs to the family Vibrionaceae. It is one of the most common species that cause human infections, with serotypes O1 and O139 once thought to be the source of epidemic cholera. Non-O1/Non-O139 *Vibrio cholerae* serotypes, are non-pathogenic and rarely cause significant symptoms. This case report describes the first documented co-infection of Non-O1/Non-O139 *V. cholerae* and rotavirus in a healthy young child. A 7-year-old girl presented with profuse vomiting, fever, and non-watery loose stools. In the ward, she received intravenous fluid therapy for rehydration, and a stool culture was sent for analysis. The stool culture exhibit a pure growth of big, flat yellow colonies that were isolated on thiosulphate citrate bile salt sucrose (TCBS) agar. TCBS is a selective medium for differentiating *V. cholerae* from other enteropathogenic *Vibrio. V. cholerae* is a sucrose fermenter that acidifies the medium and changes the bromthymol blue indicator to yellow. Gram stain showed gram-negative, curved shaped bacterium with rapid darting movement. The organism was identified as *Vibrio cholerae* using matrix-assisted laser desorption ionisation-time-of-flight (MALDI-TOF) with a score of 2.02, confirmed as Non-01/Non-0139 by serotyping. Stool rotavirus antigen was positive. Detection of rotavirus antigen from the stool taken on the same day strongly implies co-infection with Non-O1/ Non-O139 *V. cholerae*. Molecular testing can help identify the virulence factors. The emergence of disease caused by Non-O1/ Non-O139 *V. cholerae* is likely determined by a unique combination of potential virulence factors carried by the infecting strain and presence of co-infection with other organisms.

**Brucellosis or Not? The Case of _Aureimonas Altamirensis_ in A 3-Years-Old Malaysian Boy**

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*Aureimonas altamirensis* is a Gram-negative bacterium, considered as potential opportunistic pathogen in humans. It is closely related to *Brucella* species which can lead to misidentification. This case report details *Aureimonas altamirensis* misidentification as *Brucella melitensis* in a paediatric patient in Sabah. A 3-year-old boy with no comorbid presented with recurring fever, lethargy, musculoskeletal pain, headache and gastrointestinal losses which causes multiple hospitalisations. Blood culture grew gram negative short bacilli with oxidase and catalase positive. Mass spectrometry identification using VITEK-MS system yielded 'No Identification' result, while VITEK-2 system revealed *Brucella melitensis,* matching the gram stain and biochemical test. In addition, the patient lived near a cow farm, however he denied consuming unpasteurized milk. Thus, treatment for Brucellosis with intravenous Ampicillin was initiated by the treating Paediatrician. The isolate was sent to NIH for confirmation. Brucella PCR was negative and 16S ribosomal RNA PCR by NIH confirmed *Aureimonas altamirensis*. Database limitation of VITEK-MS hindering *Aureimonas altamirensis* identification highlights the critical need for more comprehensive databases for precise and prompt identification. Cases of *Aureimonas altamirensis* misidentification as *Brucella melitensis* by VITEK-2 in few reports are mostly due to the close evolutionary relationship between the families *Brucellaceae*, *Aurantimonadaceae*, and *Rhizobiales*, as shown by whole genome-based phylogenetic analysis. Such errors can result in inappropriate treatments and unnecessary public health measures. The case emphasises the importance of accurate microbial identification and confirmatory testing to prevent diagnostic errors. Further research is needed to improve these methods and avoid similar problems.

**A Case Report: A Rare Case of Mycobacterium Brisbanense Peritonitis in A Patient of Continuous Ambulatory Peritoneal Dialysis.**

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Mycobacterium brisbanense is a rapid-growing nontuberculous mycobacterium that is typically ubiquitous. This organism is considered a rare and significant human pathogen, with less than ten reported cases up to 2023. Recognising M. *brisbanense* as a potential causative agent is crucial, as it is usually resistant to most first-line antituberculous medications. In this case report, we will discuss a rare case of Mycobacterium brisbanense peritonitis in a 68-year-old Malay woman with underlying end-stage renal failure who started peritoneal dialysis in August 2022. She initially presented with lower abdominal pain, which was pricking in nature for two weeks. Abdominal examination revealed mild tenderness at the lower abdominal region, with cloudy and turbid peritoneal fluid seen at the site of the Tenckhoff catheter. Peritoneal fluid FEME appeared turbid with numerous pus cells (>25/LPF) and a total leukocyte count of 4680 cells/uL. The peritoneal fluid culture showed the presence of Mycobacterium brisbanense, identified via MALDI-TOF mass spectrometry. The patient is subsequently planned to remove the Tenckhoff catheter, with IV Amikacin treatment for 2-3 weeks post-catheter removal, and oral clarithromycin and levofloxacin for a total of 6 months. Upon discharge, the patient was well as her condition improved; all the infective cultures were negative, and she was scheduled for hemodialysis. In summary, this case contributes to the limited literature on Mycobacterium brisbanense peritonitis in CAPD patients. Early recognition and appropriate treatment are essential for successful outcomes, thus preventing complications.

**A Rare Case of Bacterial Endocarditis Caused by Corynebacterium Striatum**

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*Corynebacterium striatum* is a gram-positive, facultative anaerobe commonly found in the human skin and nasopharyngeal microbiota. Although usually non-pathogenic, it can act as an opportunistic pathogen, particularly in immunocompromised individuals. Infective endocarditis caused by *C. striatum* is rare, making timely recognition and management critical. We present a 57-year-old male with prolonged fever following acute tonsillopharyngitis. On examination, he appeared febrile and lethargic, with a pansystolic murmur detected. Laboratory investigations revealed leucocytosis, neutrophilia, and elevated C-reactive protein (CRP). Empirical treatment for infective endocarditis was initiated due to clinical suspicion. During hospitalisation, his condition deteriorated, with decreased consciousness and septic embolic encephalitis diagnosed via contrast-enhanced CT. Blood cultures taken in both aerobic and anaerobic Bactec bottles yielded *C. striatum*, identified by MALDI-TOF. Transthoracic echocardiography (TTE) revealed a vegetation measuring 1.27 × 0.8 cm on the posterior mitral valve leaflet. Further identification using 16S rRNA gene PCR confirmed *C. striatum* as the causative organism. Despite a prolonged course of parenteral vancomycin, serial TTEs showed increasing vegetation size, leading to a referral for surgical intervention. *Corynebacterium striatum*, often dismissed as contaminants, are increasingly recognised as causes of native valve endocarditis. Early diagnosis and treatment are essential to prevent severe complications. Corynebacterium species are underestimated pathogens that can cause severe infections. Prompt recognition and intervention are crucial to mitigating adverse outcomes.

***Cedecea lapagei*: A Rare Human Pathogen Causing Bacteremia in Immunocompromised Patient**

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The genus *Cedecea* (family *Enterobacteriaceae*) causes a wide spectrum of acute infections in immunocompromised hosts, from oral ulcers to pneumonia and bacteremia. Five species have been identified, including *Cedecea davisae*, *Cedecea lapagei, Cedecea neteri* and two unnamed species. *Cedecea lapagei* was recognised as a human pathogen in 2006. We report to our best knowledge, the first case of *Cedecea lapagei* bacteremia in Malaysia. A 51 years old man with underlying type 2 diabetes mellitus, hypertension and a history of cerebral vascular accident was presented to the emergency department with less responsiveness, facial asymmetry, slurring of speech and loss of nasolabial fold. On examination, his GCS was E4V1M4 with stridor, febrile and lungs showed reduced air entry bilaterally. Subsequently, he was intubated for airway protection. The blood tests revealed leukocytosis with predominantly neutrophils. CT brain revealed acute left basal ganglia haemorrhage. Chest X-ray shows right perihilar opacities. *Cedecea lapagei*, an AmpC β-lactamase producer was identified from blood cultures by MALDI-TOF mass spectrometry and Cefoxitin disc screening. The patient was diagnosed with hypertensive emergency with left basal ganglia bleed and *Cedecea lapagei* bacteremia with pneumonia. The antibiotic was escalated to IV Cefepime. Subsequently, the patient's white blood cells were reducing in trend and patient's condition was afebrile prior to discharge. Infections caused by *Cedecea lapagei* are exceedingly rare in humans. The accuracy and speed of MALDI-TOF mass spectrometry enable early identification of pathogens compared to conventional methods, allowing early initiation of appropriate antimicrobial therapy and subsequently improving patient's outcomes. Despite the relatively low mortality rate associated with *Cedecea lapagei* infections, the increasing prevalence of multidrug-resistant isolates and the limited understanding of this organism in medical microbiology necessitate further research to establish general recommendations and personalised approaches for optimal patient outcomes.

**A Fatal Case of *Fusobacterium Varium* Infection in An Elderly Patient.**

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Fusobacterium is an anaerobic organism that predominantly colonizes the oral, gastrointestinal, and upper respiratory tract. The incidence of *Fusobacterium varium* infection is less common as compared to *Fusobacterium necrophorum* and *Fusobacterium nucleatum* but is associated with severe infections. We report a fatal case of *Fusobacterium varium* infection in an elderly patient. This is a case of a 71-year-old gentleman with underlying hypertension and neurofibromatosis who presented with body weakness and slurred speech. He was diagnosed with right lentiform hyperdensities with possible cerebral involvement of neurofibromatosis. Case was discussed with neurosurgical team and patient was planned for urgent MRI. On day 11 of admission, he developed respiratory distress with a temperature spike of 37.8°C. Intravenous piperacillin-tazobactam was administered for hospital acquired pneumonia. His blood culture was positive and identified as *Fusobacterium varium* using Matrix-Assisted Laser Desorption Ionisation Time-of-Flight (MALDI-TOF) with a score of 2.58. Unfortunately, despite early antibiotic coverage, the patient succumbed due to severe pneumonia on the same day. *Fusobacterium* infection can manifest as isolated bacteraemia, soft tissue infection or head and neck infection. Bacteraemia due to *Fusobacterium* infection was associated with a higher mortality rate as observed in this patient. Among the risks of having bacteraemia infection is underlying malignancy and old age. Despite appropriate antibiotics and surgery, mortality remained high in patients with isolated bacteraemia, underscoring the need for better treatment strategies and prognostic markers. Future studies are required to ascertain the optimal therapeutic options to improve patient outcome.

**Beyond the Obvious: Delayed Diagnosis of *Entamoeba histolytica* Infection with Ruptured Liver Abscess**

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Amoebiasis, caused by *Entamoeba histolytica*, is a parasitic infection commonly affecting the intestines and liver, with significant global prevalence, especially in resource-limited settings. Here, we report a case of a 64-year-old Malay male presenting with chronic abdominal pain and constitutional symptoms, later diagnosed with a ruptured liver abscess due to *Entamoeba histolytica*. Initially treated for melioidosis, the patient's condition did not improve despite broad-spectrum antibiotics. Imaging revealed a large liver abscess with bilateral pleural effusion, prompting percutaneous drainage. Microbiological cultures were negative, and viral serology was unremarkable. Due to the lack of clinical response, a protozoan PCR was performed, confirming *Entamoeba histolytica* infection. The patient showed marked improvement following a 7-day course of oral metronidazole. This case highlights the diagnostic challenges posed by atypical presentations of amoebiasis and emphasises the importance of considering parasitic infections in non-endemic regions, especially when empirical treatments fail. Early use of molecular diagnostics like PCR is critical in avoiding delays in diagnosis and improving patient outcomes in amoebic liver abscess cases.

**Central Nervous System Listeriosis – A Case Study**

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This is a report of a case of Listeria monocytogenes bacteraemia in an oncology patient. Cases of bacteremia complications with central nervous system (CNS) Listeriosis are relatively high, with mortality rates of up to 70%. This facultative anaerobic bacterium, was isolated in pure culture in a 55 years old Stage IV Nasopharyngeal cancer patient who presented with fever, headache & vomiting. Eventually became less responsive in the ward. Brain CT had no brain parenchymal lesions/suspicious leptomeningeal enhancement. Blood culture taken during this ordeal yielded Listeria monocytogenes, as identified by MALDI-TOF MS with susceptibility to Penicillin. Septic shock with persistent coagulopathy prevented further investigation with lumbar puncture, however after antibiotic treatment; patient recovered well and was discharged home. The successful identification by MALDI – TOF MS, helped this patient have a successful treatment outcome. Listeria monocytogenes invades the cytosol of cells and causes gastroenteritis; however in vulnerable immunocompromised patients, it causes life-threatening invasive infections causing bacteriaemia/sepsis and infection of the CNS. Here, despite not being able to proceed with confirmatory test of CSF biochemistry & cultures, the clinical presentation with presence of *L. monocytogenes* bacteraemia prompted the effective working diagnosis of CNS Listeriosis (meningitis). *L. monocytogenes* is a facultative, intracellular parasitic bacterium; therefore, the ideal antimicrobial agent should be able to penetrate host cells and bind to intracellular targets. Precise identification of *L. monocytogenes* & use of IV Ampicilin for 3 weeks positively impacted this patient in an otherwise, high risk with a high mortality rate infection.

**Perforated Gallbladder Empyema with Cystic Duct Dilatation Concurrent Ascaris Infestation and *Salmonella Typhi* Bacteremia**

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Gallbladder empyema is a rare severe manifestation of acute cholecystitis, often precipitated by cystic duct obstruction. Intestinal parasitic infestation, notably *Ascaris lumbricoides*, can exacerbate this condition by obstructing the biliary tract and mimicking gallbladder disorders. Additionally, *Salmonella Typhi* bacteraemia in this patient further complicate the clinical picture in this case. Case Presentation: A 38-year-old Orang Asli female presented with 2-day history of abdominal pain, loose stools, and vomiting. Physical examination revealed right upper quadrant tenderness and positive Murphy's sign. Blood investigations showed hypochromic microcytic anaemia and neutrophilia. Initial abdominal ultrasound indicated the presence of cholelithiasis. However, contrast-enhanced computed tomography (CECT) revealed perforated gallbladder with empyema, cystic duct dilatation, enhancement, and multiple laminated calcifications at the gallbladder and neck of the cystic duct, possibly indicating calcified worms. Stool for ova and cysts was positive for presence of *Ascaris* and *Trichuris* ova. Blood cultures revealed presence of gram-negative bacilli subsequently identified as *Salmonella Typhi*. Ultrasound-guided percutaneous cholecystostomy was performed, draining 100 CC of haemoserous fluid. The patient was treated with antibiotics and antihelminthic. Discussion: This case illustrates a rare and intricate scenario where gallbladder empyema was complicated by *Ascaris* infestation and *Salmonella Typhi* bacteraemia. The *Ascaris* infection likely contributed to bile obstruction and empyema formation. The coexistence of other biliary tract disorders, such as choledocholithiasis and S*almonella Typhi* complicated the diagnosis and management of the patient's condition. Conclusion: Clinicians should anticipate parasitic infections in spectrum of gallbladder disease in patients from endemic regions for optimal management.

**Timely Diagnosis and Targeted Treatment: A Case Report of Successful Management of Listeriosis in A Newborn**

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Gram-positive *Listeria monocytogenes* pose significant risks, particularly to neonates and high-risk populations. Neonatal listeriosis can manifest as early-onset disease within the first week of life or late-onset disease, with high mortality rates, especially among preterm infants. A term infant was delivered via emergency caesarean section by a mother who presented with fever and urinary symptoms with no known high-risk food exposure prior to delivery. The infant exhibited respiratory distress and required oxygen supplementation shortly after birth, subsequently covered for congenital pneumonia. Blood cultures revealed *Listeria monocytogenes* identified by matrix-assisted laser desorption/ionisation (MALDI-TOF). Cerebrospinal fluid (CSF) analysis showed leucocytosis and elevated protein, with negative CSF culture. The antibiotic given to the infant included intravenous (IV) ampicillin and gentamicin. However, the infant's condition deteriorated, requiring intubation and inotropic support. Subsequently, antibiotics were escalated to amikacin, meropenem, and sulfamethoxazole and trimethoprim, a total of 2 weeks antibiotic treatment was given. The infant ultimately improved, was extubated on Day 11 of life, and discharged after 26 days of admission. Diagnosing neonatal listeriosis is challenging due to its low incidence, non-specific symptoms, and the potential for misidentification with other Gram-positive organisms. Conventional culture methods for isolating Listeria are time-consuming and may be outcompeted by other microbes, especially in non-sterile samples. To address these challenges, laboratories are increasingly adopting MALDI-TOF, which enhances identification speed and accuracy, although the implementation is costly. Neonatal listeriosis, though rare, can cause severe complications and high mortality, making accurate early diagnosis and timely treatment essential for improving outcomes.

**A Complicated MSSA Catheter-Related Blood Stream Infection with Infective Endocarditis and Multiple Metastatic Foci in A Hemodialysis Patient: A Case Report**

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Catheter-related blood stream infection (CRBSI) is a serious complication in hemodialysis patient with prolonged catheter dependance. A 20-year-old recently diagnosed end stage renal failure (ESRF) gentleman on regular hemodialysis presented to us with reduced effort tolerance and persistent vomiting. His central and peripheral blood cultures grew methicillin-sensitive *Staphylococcus aureus* (MSSA) thus treated as CRBSI which catheter was then removed. He proceeded with a routine echocardiogram (ECHO) and abdominal ultrasound; which revealed tricuspid valve vegetation measuring 14 × 23 mm with thrombus in pulmonary artery and splenic lesion of likely infective foci respectively. CT pulmonary angiography showed multiple scattered cavitating and non-cavitating lesion with several pulmonary arteries aneurysm. Despite clinical improvement and bacteremia clearance with six weeks cefazolin for infective endocarditis (IE) treatment, serial ECHO revealed increasing vegetation size up to 28mm. He was then referred to Cardiothoracic surgeon for valve replacement. We report a complicated case of MSSA CRBSI with IE and multiple metastatic foci namely lung, large vessels and spleen. *Staphylococcus aureus* is the second most common organism causing CRBSI in hemodialysis patient, and is the most common pathogen causing IE. Our patient was indicated for urgent surgery due to isolated large vegetation for embolism prevention. With the background of ESRF, appropriate investigation is warranted to differentiate heart failure from valvular dysfunction, mimicking fluid overload from kidney failure. IE may involve multi-organ systems causing great challenges to clinicians. Therefore, multidisciplinary involvement between infectious disease, cardiologists and microbiologists is essential.

***Staphylococcus aureus* Endogenous Endophthalmitis Secondary to Calf Carbuncle Requiring Eye Evisceration: A Case Report**

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Endogenous endophthalmitis (EE) is a rare ophthalmological emergency with devastating visual outcomes. A 69-year-old gentleman with underlying diabetes and renal failure on hemodialysis came with sudden onset non-traumatic right-sided blurring vision and right leg pain for two days. Upon arrival, right eye visual acuity was hand gestures and investigation showed unmeasurable high capillary glucose and severe anaemia. He was treated as EE and hyperosmolar hyperglycemic state secondary to right lower limb cellulitis with empirical intravitreal vancomycin, ceftazidime and amphotericin B, anti-inflammatory eye drops and intravenous antibiotics. Intravitreal tapping attempt was failed. He progressed to right eye total blindness on the fourth day and CECT orbit revealed evidence of right orbital infection involving pre-septal and globe. He subsequently underwent right eye evisceration and right calf carbuncle saucerisation in the second week of admission as his condition stabilized. Both intraoperative tissues from eye and calf grew methicillin-susceptible *Staphylococcus aureus* (MSSA), however, blood culture was reported negative. He was discharged well after total of two weeks intravitreal and systemic antimicrobials. EE occurs secondary to distant foci infection, accounts for minority endophthalmitis cases. Although fungi being the most common etiology, bacteria such as *Staphylococcus aureus*, is often associated with poorer visual outcome. This case represents a survivor case of rapid progression culture-proven EE

requiring eye evisceration despite early intravitreal and systemic antimicrobials treatment. Cultures are essential, of which vitreous is superior to blood. Early EE detection and prompt treatment is crucial to avoid disease morbidity and mortality.

**Case Report: False Positive Rapid Plasma Reagin in a Patient with Severe Aplastic Anaemia and Thymoma on Immunosuppressive Therapy**

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The rapid plasma reagin (RPR) card test is a widely used screening tool for the serological detection of syphilis due to its simplicity and cost-effectiveness. However, limitations exist, including the potential for false-positive results, particularly in individuals with underlying medical conditions. We present a case report of a 38-year-old female with thymoma and severe aplastic anaemia who exhibited a false-positive RPR test result, highlighting the complexities of interpreting serological tests for syphilis in patients with underlying conditions. Despite negative confirmatory tests of syphilis, the patient's RPR titers continued to rise, reflecting the challenges of distinguishing true positives from false positives in individuals with complex medical histories. This case highlights the importance of considering patient-specific factors and employing confirmatory testing strategies to ensure accurate diagnosis and appropriate management. Healthcare professionals must be aware of the potential for false-positive results in RPR testing and exercise caution in interpreting results, particularly in patients with underlying medical conditions and a history of blood transfusions. This case emphasises the need for a comprehensive approach to syphilis diagnosis, integrating clinical evaluation, patient history, and confirmatory testing to mitigate the risk of misdiagnosis and ensure optimal patient care.

**Poster Presentation: Original Article**

**Pre-Analytical Phase Errors: The Ultimate Rationale of High Laboratory Sample Rejection in Hospital Bentong**

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Errors associated with the pre-analytical phase as mentioned in the Total Testing Process affect the sample integrity which leads to sample rejection in laboratory. Non-adherence of pre-analytical procedures is among the reasons for rejection. A sample that is considered as not fit for analysis may get rejected as a precaution for results accuracy. This study was conducted to analyse the rate of laboratory sample rejection by units & to identify the pre-analytical errors that contributed to sample rejection in Hospital Bentong. The data of laboratory sample rejection in year 2023 were extracted from Laboratory Information System. Questionnaire-based assessment on pre-analytical phase of laboratory testing was conducted among 67 phlebotomists, who volunteered, over the period 14/08/2023 - 17/08/2023. High sample rejections in year 2023 were from Emergency & Trauma Unit (ETU) & followed by the male ward which eventually caused the laboratory sample rejection to 1.84% overall in Hospital Bentong. The pre-analytical errors in sample collection & handling contributing to in-vitro haemolysis & clotted samples were identified as the major reason for rejection where 44.81 % & 36.24 % respectively among the total rejected sample. Rejection due to insufficient samples were 10.89%, while wrong containers & barcode errors were respectively 5.86% & 3.82%. Questionnaire-based assessments on pre-analytical phase among phlebotomist in Hospital Bentong were less than 50% scoring which was the main reason behind high laboratory sample rejection.

**Reflex Testing Proposal for Bilirubin: Do We Need Direct Bilirubin in The Panel?**

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Reflex testing is a procedure where additional tests are automatically ordered based on initial abnormal test results. Total bilirubin (TBIL) and direct bilirubin (DBIL) are often ordered together at our facility. Therefore, the objective of our study was to evaluate the impact of the bilirubin reflex testing algorithm. We conducted a retrospective and observational study by reviewing patient records from January 2023 to December 2023 in Hospital Mukah. We categorized the test results into four groups, (1) TBIL normal and DBIL normal, (2) TBIL high and DBIL normal, (3) TBIL normal and DBIL high (4) TBIL high and DBIL high. We then assessed the number of tests in each category and calculated the median (min, max) of test results using SPSS Statistics Software version 26. During the assessed months, a total of 9,834 orders were placed for TBIL and DBIL tests. Of these, the predominance of tests (83.8%) is normal for both analytes; only 16.2% of the orders had more than ≥ 1 abnormal result. The majority of bilirubin tests ordered by the emergency department, out-patients, and hospitalized patients fall within the reference interval. Specifically, 83.8% of the total orders, equating to 8,241 tests for both normal total bilirubin and direct bilirubin. Translating these 8,241 direct bilirubin tests into financial terms, at a cost of RM0.50 per test, amounting to RM4,120.50 per year. Consequently, implementing reflex testing for elevated total bilirubin could eliminate the need for a significant number of direct bilirubin tests without jeopardizing patient safety.

**Quality Indicators of The Preanalytical Practice in Point of Care Testing (POCT) Involving Multi-sites Blood Gas Analysers: An Audit in A Tertiary Public Hospital**

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Adherence to good pre-analytical practices in POCT Blood Gas Analysis (BGA) is important to ensure quality results, patient's safety and fulfill accreditation requirements. To determine the frequency of BGA reports completed with operator ID and two unique patient identifiers as recommended by national guidelines. The types of patient's identifier used in BGA reporting are determined. BGA reports for one month were extracted from 17 units of GEM Premier Blood Gas Analysers located in multi-department POCT sites. Retrospective data analysis by simple random sampling of reports in all locations. 11 POCT locations; a total of N=13,537 reports generated within specified interval. 18% (n = 2449) reports were audited. 80% (1979) were completed with operator ID; with non-compliance seen in ICU hybrid, Medical OPD and few general wards. Most reports had 1 type of patient's identifier (56.9%, 1394); followed by 2 types of identifiers (28.4%, 696) and no identifier in the remaining reports (14.7%,359). Among reports with 2 types of patient's identifiers, 72% (502) used "Registration Number/IC" and "Name"; contributed mainly by Emergency Department (ED) since it is the only POCT site with instrument connectivity to hospital information systems and dedicated analysers operators. Excluding ED results, commonly used identifiers were for example bed numbers, oxygen supply status or uncertain meaning alphanumeric identifiers. Adherence to the proper POCT ABG handling as per standards is still inadequate; requiring actions for improvements.

**Folate study: Assessing analyte stability in serum separator gel tube**

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This study aims to compare serum folate test results stored in plain secondary tube (recommended by manufacturer) and in serum separator gel tube. Method: Forty patients' samples were aliquoted and stored in a secondary tube and gel tube at 2-8 degree Celsius for up to 7 days. Samples were then analysed using the Abbott Architect i1000SR analyser. Bias was calculated at medical decision points (MDP) based on the linear regression equation and compared with pre-determined Analytical Performance Specification (APS) of less than 15.5% (based on Total Error (TE) derived from Desirable Biological Variation). Bias calculated at medical decision points is acceptable (3.2-12.2%). It was concluded that results measured in plain secondary tubes are comparable to those of serum separator gel tubes. Storing serum samples in serum separator gel tube is more practical in batch testing analytes and this finding can support current practice in our laboratory.

**Unmasking Falsely Elevation of Plasma Ammonia**

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The Paediatric Clinic at Hospital Universiti Sains Malaysia (USM) has reported issues with plasma ammonia levels in paediatricpatients. An investigation has revealed that paediatricPotassium Ethylenediaminetetraacetic Acid (K2EDTA) tubes may be causing the elevated results. The aim is to assess three different types of K2EDTA tubes to identify the source of the problem. Plasma Ammonia was obtained from 10 volunteers using three distinct types of K2EDTA tubes - Tube 1 (adult BD), Tube II (PaediatricLabtub PC), and Tube III (paediatricBD Vacutainer®) - and subjected to analysis through the COBAS e800 analyser. The data were analysed using One-way ANOVA and simple linear regression. Statistical significance was set at $P<0.05$. The average biases between tubes were compared with desirable specifications derived from biological variation. Mean plasma ammonia levels were $16.3 \pm 5.25$ for Tube I, $249.0 \pm 38$ for Tube II, and $18.10 \pm 5.76$ for Tube III. Statistical significant differences were found between Tube I vs. Tube II and Tube II vs. Tube III ($P < 0.001$), while Tube I and Tube III showed no significant difference. Simple linear regression analysis for Tube I and Tube III showed good correlation and no significance bias. However, poor correlation and unacceptable positive constant bias was observed between Tube I vs Tube II (95% CI: 196.79 to 381.82) and Tube II vs Tube III (95% CI: 102.91 to 283.05). The mean % bias for Tube I vs Tube II was 1541%, compared to 11.3% for Tube I vs Tube III and 1368% for Tube II vs Tube III, exceeding the desirable acceptable bias ± 5.45%. Tube II caused falsely elevated plasma ammonia levels, possibly due to a manufacturing defect, leading to unnecessary admission and follow-up investigation. Tubes I and III showed clinically significant bias, likely due to differences in preservative composition in these tubes.

**Liver Transaminases: Another Potential Biochemical Indicator of Organophosphate Pesticide Poisoning?**

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Organophosphate Pesticides (OPPS) are major chemicals used in fogging operations in Malaysia to control dengue outbreaks. OPPS accumulated in a long term would cause damage to the liver through biotransformation. When the liver is injured or impaired, such as in cases of OPPS poisoning, the levels of liver transaminases in the bloodstream can become elevated, serving as important

indicators of liver damage. This study aimed to determine Liver Transaminases as another potential biochemical indicator of OPPS poisoning. Serum samples from 160 Vector Operators with OPPS exposure and non-exposed to OPPS were chosen by random sampling. The samples were analysed for Liver Transaminases using Automated Chemistry Analyser Beckman Coulter AU480. The data analysis was performed using *t*-test. The results have shown that the mean Alanine Aminotransferase (ALT) and Aspartate Aminotransferase (AST) levels are higher among the Vector Operators exposed to OPPS. However, the mean differences compared to the non-exposed group are not significant as $p>0.05$. These higher Liver Transaminase levels specifically ALT and AST among the OPPS exposed group serve as important markers for diagnosing and assessing the severity of liver injury in cases of OPPS poisoning. We can infer that Liver Transaminases as a potential biochemical marker for predicting the severity of OPPS poisoning with consideration of larger sample size and other related variables especially for long-term exposure to OPPS. This study provides valuable insight into occupational chemical hazards and incidents of liver disease in the future.

**Enhancing Financial Resilience: A novel technique utilizing reconstituted Feacal Occult Blood Test (FOBT) External Quality Assurance (EQA) material among district hospitals in Kedah.**

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EQA programme, albeit an important quality aspect, can be costly to subscribe to, especially in limited-resource laboratories such as in district hospitals. We developed a novel method to reduce these costs while maintaining the effectiveness of EQA in the state of Kedah. This study aims to analyse the cost savings and effectiveness of this novel method. Retrospective analysis from May 2023 to August 2024 (total of 4 surveys) with 8 laboratories participating in FOBT inter-laboratory comparison. Each survey consisted of 2 standardised EQA materials i.e. the leftover reconstituted commercial EQA from tertiary hospitals; aliquoted, frozen, and passed to all participants. A preliminary stability study was performed to guide the provider in choosing appropriate leftover materials. Post analysis by participants, results were submitted to the coordinating lab and compared to target concentrations in the commercial EQA provider's official report. Data was analysed using Excel Software and all information was managed online via a specific link. An overall high degree of accuracy with target values of 75% of samples being concordant and 25% discordant. Result variations were observed among samples with target values at the cut-off point because these samples' stability is poor when reconstituted and freeze-thawed again. The cost savings of the FOBT EQA samples were about RM26,000 (an 80% reduction from the original expenditure). Significant cost savings were achieved with this novel method. As this is a single-center study, a prospective multi-center study is recommended to validate the results and assess the broader applicability.

**National Thalassemia Coding System: Beyond Laboratory Diagnosis**

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Thalassaemia is one of the common genetic disorders in Malaysia. Prevalence of α and ß-thalassemia varies between 4.5% to 40%. The National Thalassaemia population school screening programmes have been introduced in 2016. Complexity of thalassemia diagnosis without an integrated database leads to difficulties in delivering accurate diagnosis to client and statistical collection. The national thalassemia coding (NTC) system was initiated in 2012 to standardise haemoglobin analysis and DNA analysis reports, creating a database for thalassemia diagnosis among Ministry of Health (MOH) hospitals laboratories. Capillary Zone Electrophoresis (CZE) is mostly used as the first method of haemoglobin analysis and High Performance Liquid Chromatography (HPLC) as secondary method for thalassemia screening and diagnosis. Hb analysis Coding system were divided into 6 main categories namely no abnormality detected (N), α-thalassaemia (A1-A7), β-thalassaemia(B1-B7), haemoglobinopathies(C1-C13), haemoglobin variants or other findings (D1-D16) which require DNA analysis as a confirmatory method. The DNA coding system is more complex and was classified into heterozygous, homozygous and interaction between different genotypes commonly found in Malaysia. NTC has successfully developed a national database of thalassemia diagnosis, identify common types of thalassemia, mapping of thalassemia prevalence, identify cut off value of MCV and MCH levels for alpha thalassemia screening, able to differentiate between thalassemia carriers and disease and facilitate genetic counseling and family screening. This coding is not only applicable for laboratory databases but simplifies the complex thalassemia diagnosis. Thus, this coding becomes an important rule to facilitate communication between health-care personnel.

**Haemoglobin And Haematocrit Determination by Point-Of-Care Testing, Performance Evaluation Compared to Automated Haematology Analyser**

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Health care services are essential in the community. Point-of-care testing (POCT) plays a crucial role in delivering urgent and appropriate health services, especially in peripheral communities, emergencies, disaster areas and overcrowded areas. POCT for haemoglobin (Hb) measurement allows rapid and accurate results at a reduced cost. In this study, our aim was to compare the values of Hb and haematocrit (HCT) determined by POCT devices and automated haematology analyser in Hospital Cancelor Tuanku Mukhriz (HCTM). We evaluated the accuracy of Very Q Hb meter for measurement of Hb and HCT among 100 volunteer subjects with normal Hb level at Haematology laboratory, Department of Laboratory Diagnostic Services, HCTM. A drop of blood sample was applied onto the test cartridge. The findings of Hb and HCT results were then compared with Sysmex XN 300 Automated Haematology Analyser (Japan). Overall, the correlation between POCT-Hb and Sysmex-Hb was highly significant ($r = 0.9671$, $p<0.001$), similar with POCT-HCT and Sysmex-HCT was also significant ($r = 0.855$, $p<0.001$). Mean differences were -0-645g/dl for Hb and -0.87% for HCT. Precision studies for both Hb and HCT by POCT showed good repeatability. Overall, we found a highly significant correlation between POCT devices and Sysmex XN 300 Automated Haematology Analyser in the measurement of Hb and HCT. This Haemoglobin meter provides the most precise results that are equivalent to laboratory haematology analyser. It is easy to handle and provides fast and accurate results.

**Impact of Automated Labelling System in the Pre-Analytical Phase at the Outpatient Phlebotomy Center in Hospital Melaka**

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The laboratory total testing process (TTP) comprises preanalytical, analytical, and postanalytical phases. Preanalytical errors contribute to around 60%-70% of laboratory errors. Upon requesting pathology tests, till now wards and outpatient clinics at Malacca Hospital still need to use test request forms and manual labelling of the tube's specimen. This study to demonstrate an automatic blood tube labelling to enhance efficiency and accuracy of labelling process, reduce preanalytical errors and lean management at the outpatient phlebotomy services. The MyPHLEBO Pre-Analytical Solution System, which uses AI models for tube selection and labeling, has been used for outpatient phlebotomy services since 2022. The study evaluated the patients waiting time from registration, tube labeling till phlebotomy, correct tube selection and correct patient's identification on tubes and forms by monitoring specimen rejection and incident reporting. MyPHLEBO system has reduced the patient waiting time from an average of 90 and 60 minutes in 2022 and 2023 respectively to 5 minutes (single test) and 30 minutes (multiple tests) recently. This system excellently selected the correct tubes (100%) by zero rejection of wrong tube usage. Rejection specimens due to wrong/incomplete/ discrepancy labeling were reduced from 13 cases (2022) to 10 cases (2023) and 2 cases (Jan-June 2024). Incident reporting related to wrong labeling is reducing from 3 cases (2023) to 2 cases (Jan -Jun 2024). By integrating AI into the pre-analytical practice, outpatient phlebotomy service can become more efficient, accurate and patient-centered, ultimately leading to better outcomes and reduced operational costs.

**Verification of Rosner Index (RI) Cutoff Values for Prothrombin Time (PT) and Activated Partial Thromboplastin Time (APTT) Mixing Tests Interpretation at Haematology Laboratory Hospital Tunku Azizah (HTA)**

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A mixing test is frequently conducted to investigate unexplained prolonged Prothrombin Time (PT) and/or Activated Partial Thromboplastin Time (APTT). It helps determine whether the cause is a factor deficiency or the presence of inhibitor. The Rosner Index (RI) is a commonly used formula for determining correction and interpretation. A value of less than 12% suggests correction, indicating a likely factor deficiency, while a value of more than 15% suggests the presence of an inhibitor. Values between 12-15% are considered indeterminate, and strongly demand clinical correlation for further investigations. These cutoff values require verification at local laboratory. To verify the RI cutoff values used for interpreting mixing tests in our laboratory, a retrospective analysis of 22 PT and 33 APTT 1:1 mixing tests was conducted on cases diagnosed with specific factor deficiencies (inherited and acquired) and inhibitors. RI values were analysed by diagnosis category, with all diagnoses confirmed by factor assays, inhibitor study, or lupus anticoagulant tests. For factor deficiencies, all 22 PT mixing tests showed values below 12% (mean: 5.6%). Similarly, 16 out of 19 APTT mixing tests for factor deficiencies, had values below 12% (mean: 8.5% at immediate & 7.8% at 2 hours incubation), confirming a correction. In contrast, 12 out of 14 APTT mixing tests for inhibitor cases showed values above 15% (mean: 37.5%). Overall, five cases fell between 12-15%, indicating an indeterminate interpretation (mixture of factor deficiency and inhibitor cases). In conclusion, RI cutoff values were successfully verified for our local laboratory use, with clinical correlation remaining crucial for accurate interpretation.

**Serotype And Genotype Diversity of Dengue Virus Circulating Trend From 2018-2022 in Dengue Virus Surveillance System (DVSS) Sentinel Sites in Johor**

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Dengue virus (DENV) poses a substantial global public health threat, imposing a considerable burden of illness. The primary objective of this study was to explore the prevalence and genetic variations of DENV serotypes and genotypes in Johor, Malaysia, spanning the years 2018 to 2022. A total of 5,611 samples, collected from Dengue Vector Surveillance System (DVSS) sentinel sites, underwent serotyping, with subsequent in-depth genotyping and phylogenetic analysis applied to 38 samples from severe dengue cases. The predominant serotype observed throughout the study was DENV 2 (47.0%), followed by DENV 3 (31.0%), DENV 1 (13.0%), and DENV 4 (9.0%). Genetic diversity assessment, accomplished through DNA sequencing of the dengue Envelope (E) gene in 38 severe and fatal dengue cases, revealed the presence of five distinct genotypes among the four DENV serotypes. Notably, the D2Cosmo_cladeIb genotype dominated among DENV 2 cases, comprising 76.3% of instances, indicating its prevalence in the study population. DENV 3 cases exhibited two genotypes (D3G1 and D3G111), identified in five cases, while DENV 1 cases demonstrated a singular genotype (D1G1). An exclusive case of DENV 4 was detected, aligning with the D4GII genotype. Furthermore, a statistically significant association between dengue serotype and disease severity was observed. This underscores the potential link between the specific DENV serotype and the severity of dengue illness, urging further exploration of underlying mechanisms. In conclusion, this study contributes valuable insights into the dynamic distribution and genetic diversity of DENV in Johor, Malaysia, providing a foundation for refined public health strategies and targeted interventions.

**Predictors of COVID-19 Clusters Among Negeri Sembilan SARS-CoV-2-Positive Patients in 2021**

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Although less fatal than other members of the same lineage, the SARS-CoV-2 virus has caused the most catastrophic pandemic owing to its high infectivity. Cluster patients, especially those associated with variants of concern (VOC), inflict a huge economic impact. We aim to predict COVID-19 cluster status among SARS-CoV-2 positive patients in Negeri Sembilan in August 2021. This is an observational cross-sectional, aetiologic study conducted from 1st August 2021 to 1st August 2022 at Hospital Tuanku Ja'afar, Seremban. Combined oral and nasopharyngeal swab samples received during the period of 1st August 2021 to 31st October 2021 were randomized into 390 samples. Medical records of the patients were reviewed for demographic and clinical characterization, and cluster status was cross-checked with the state health department epidemiology unit. The majority of cluster patients were indigenous people, living in Jelebu district, and were clinically asymptomatic. The cluster patients' age was significantly younger than that of the non-cluster patients. Clinical symptom status and age were statistically significant univariate predictors of COVID-19 cluster. However, upon multivariate analysis, only clinical symptom status was found to be a significant risk factor for COVID-19 cluster status, with the odds ratio for asymptomatic patients being 4.89 compared to symptomatic patients. Cluster patients are more likely to be younger and asymptomatic compared to non-cluster patients**.**

**Antinuclear Antibody Test: A Descriptive Evaluation of EliA™ CTD Screen in Comparison to Indirect Immunofluorescent and ENA Line Immunoblot Assays**

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Antinuclear antibody (ANA) is the serological hallmark for systemic autoimmune rheumatic diseases (SARDs). There are several methods for detecting ANA other than the reference method, indirect immunofluorescent (IIF) assay using HEp-2 cells. We aim to evaluate the performance of EliA™ CTD Screen in comparison to IIF and ENA (16 cellular antigens) line immunoblot assays currently employed by our laboratory. 44 ANA IIF positive sera with available ENA follow-up testing results were analysed using EliA™ CTD Screen (Thermo Fisher Scientific). 45.5% and 81.2% of ANA IIF positive samples were positive by EliA™ CTD Screen and ENA immunoblot, respectively. All 7 borderline negative samples by ENA immunoblot were negative while 1 absolute negative sample by ENA immunoblot was positive when tested by EliA™ CTD Screen. 9 samples were positive only by ENA immunoblot for antibodies against antigens that are not included in EliA™ CTD Screen i.e. AMA-M2, DFS-70, and histone. Despite included, EliA™ CTD Screen was unable to detect samples found to be positive for anti-Scl-70 (3+), anti-SS-B (1+), and anti-Jo-1 (1+) by ENA immunoblot. The ability of EliA™ CTD Screen to detect antibodies to Sm, dsDNA, Ribosomal P and nucleosomes in this study is uncertain. The positive, negative and overall percent agreement between EliA™ CTD Screen and ENA immunoblot was 65.5%, 85.7% and 69.4%, respectively. In conclusion, EliA™ CTD Screen can detect most of the ANA-specific autoantibodies important for SARDs. The sensitivity of the EliA™ CTD Screen, however, does not necessarily match the cut-off values of each ENA immunoblot antibodies.

**Kelantan Towards Zero BFMP Slide Discrepancy at the Brink of Malaria Elimination**

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Malaysia is on the brink of malaria elimination. Cross-checking of BFMP slides is part of QA to maintain slide discrepancy less than 1% in Malaysia. The aim of this study is to investigate and do corrective action for all malaria cases with errors during slide rechecking in Kelantan. A cross-sectional study was conducted in 2023. All microscopic centres in Kelantan will send all positive cases and 10% of negative slides to Kota Bharu Public Health Laboratory for rechecking monthly. All discrepancy cases will be confirmed by PCR test. Audit visits will be conducted to assess staff competency, microscope performance, quality of the reagent and equipment used etc. Refresher training is compulsory for the related staff. In 2023, Kelantan recorded 18 cases of discordance (0.3%) which increased from 9 cases in 2022. Half of the cases involved foreigners. 17 of the slides were from Malaria Red Zones; Gua Musang (10), Kuala Krai (3), Jeli (3) and Tanah Merah (1). About 39% (7) of the slides were poor in quality. There were few possible causes for errors; very low density with early trophozoites stage (7), poor quality of staining(2), 3 cases related with staff competency and 1 case due to technical problems. 1 false negative case was detected from the private lab. Total of four slides with morphological challenges, and therefore, a discussion among experts was conducted to overcome the issues. Corrective actions must be taken whenever non-conformity is identified. Very low-density count with early trophozoite stage is the only culprit that enable us to achieve zero errors in BFMP.

**Diagnostic Performance and Clinical Impact of A Gastrointestinal Multiplex Panel in Acute Gastroenteritis Patients: A Pilot Study**

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Accurate and timely diagnosis of acute gastroenteritis is an unmet clinical and public health need, as diarrhea remains a leading cause of morbidity and mortality worldwide. Conventional methods for the identification of gastrointestinal pathogens, for example antigen tests, microscopic examinations for parasites and culture are time-consuming, costly and have limited sensitivity. Viral pathogens other than Rotavirus are rarely documented. Our study aims to compare the performance of QIAstat-Dx Gastrointestinal Panel (GIP) and routine diagnostic methods in patients suspected to have acute gastroenteritis in a university hospital in Malaysia in terms of diagnostic sensitivity, turnaround time, cost-effectiveness and technical ease of use. In this study, 30 archived fecal specimens from patients suspected to have infectious gastroenteritis were randomly selected and tested with QIAstat-Dx Gastrointestinal Panel (GIP), and the results were compared with routine diagnostic methods. QIAstat-Dx GIP detects pathogens in 16 (53.3%) specimens, compared to 7 (23.3%) for conventional methods. The GIP assay detected an additional 22 enteropathogens that were not detected or tested by conventional testing. These included Enteroaggregative *E.coli* (EAEC), Enteropathogenic *E.coli* (EPEC), *Salmonella spp*, *Campylobacter spp*, *Plesiomonas shigelloides*, *Clostridium difficile* (tcdA/tcdB), Norovirus, *Cyclospora cayetanensis* and *Giardia lamblia*. QIAstat-Dx GIP panel is a potentially valuable tool for detecting the causative pathogen for acute gastroenteritis with improved sensitivity and rapid turnaround time that would impact patient management.

**Confronting Melioidosis in Sandakan: A Retrospective Study on Epidemiology, Microbiological Data and Mortality in 2023**

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This study aims to provide local data on melioidosis in Sandakan by analysing epidemiology, microbiology data, and clinical outcomes. It will determine demographics, clinical presentations, anti-melioidosis susceptibility, treatment initiation, and mortality. A one-year retrospective study was conducted on patients admitted to Hospital Duchess of Kent Sandakan with culture-confirmed melioidosis in 2023. Data were extracted and analysed to describe epidemiological data, clinical and laboratory findings. A total of 99 isolates from 45 confirmed cases of melioidosis were recorded. Most were male (66.6%), with the highest age group being 45 to <60 years (37.7%). Notably, the paediatric group (<5 years old) was among the highest (20%). 77.8% of patients had comorbidity, prominently diabetes mellitus (51.1%). Many patients lived in construction and muddy areas (57.7%). Majority of the patients had pneumonia (80%), followed by skin and soft tissue infections (22.2%) and deep abscesses (15.5%). Interestingly, 11.1% had gastrointestinal symptoms. All isolates were 100% sensitive to ceftazidime and carbapenems, with 6% resistant to cotrimoxazole. The average diagnosis time via positive culture was 3.7 days, however, only 31.1% received ceftazidime and carbapenems as empirical therapy. Nearly 90% of paediatric cases experienced delays in anti-melioidosis treatment. Overall mortality was 31.1%, with children under 5 experiencing the highest (15.5%). This study provides crucial insights for clinicians to identify at-risk patients for melioidosis and emphasises the need for prompt empirical treatment, particularly in paediatric cases.

**Evaluating Molecular Detection of Enterovirus Across Various Clinical Specimen Types Using an In-House Real-Time RT-PCR Assay**

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Enterovirus real-time RT-PCR has become a vital diagnostic platform due to its sensitivity, specificity, and rapid turnaround time. However, the detection capability may vary depending on the specimen type. This study examined the enterovirus real-time RT-PCR performance across various clinical specimen types. A total of 1553 samples consisted of 565/1553 (36.38%) cerebrospinal fluid (CSF), 456/1553 (29.36%) rectal swab and stool, 352/1553 (22.67%) upper respiratory tract (URT) sample, 27/1553 (1.74%) serum, 6/1553 (0.39%) lower respiratory tract (LRT) sample, 4/1553 (0.26%) blister swab and 143/1553 (9.21%) others, including post-mortem specimens were sent for enterovirus investigation from January 2023 to June 2024. The samples were extracted using QIAamp Viral RNA Mini Kit and subjected to an in-house real-time enterovirus RT-PCR assay. The highest detection rate of enterovirus was observed in blister swabs (25.00%), followed by URT samples (20.17%), LRT samples (16.67%), and rectal/stool specimens (15.79%). Tissue and CSF exhibited low detection rates, accounting for 4.20% and 2.48%, respectively, and nil was detected in serum. The lowest cycle threshold (CT) values were observed in positive URT samples (mean 29.10, SD = 4.24) and stool/rectal swabs (mean 30.86, SD = 3.76), suggesting an optimal detection capability. Common reasons for sample rejection were inappropriate transport media (29.03%), followed by insufficient specimens or leakage (24.19%), and receipt of inappropriate specimens (20.97%). The findings offer guidance to clinical practices on specimen selection for enterovirus testing. Additionally, the insights gained can aid in refining strategies for diagnostic, epidemiological studies and outbreak investigations, where rapid and accurate detection is essential.

**Whole Slide Imaging for Cervical Cytology Screening: A Diagnostic Accuracy Study**

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The primary objective of this study is to evaluate the sensitivity, specificity, and intra-observer reproducibility of Whole Slide Imaging (WSI) for cervical cancer screening and to compare its performance with conventional light microscopy (CLM). This study conducts a retrospective analysis of Pap-stained Liquid-Based cervical smears (LBP) obtained from the Pathology Department, Hospital Miri, Sarawak. Sixty LBP (n=60) were digitally scanned. These digitalized WSIs were uploaded to a server and remotely reviewed by an experienced cytoscreener using an online slide viewer. Each digital smear was categorized as Positive or Negative and further classified according to The Bethesda System 2014 criteria. In a subset of 10 confirmed positive cases (n=10), WSI achieved a detection rate of 90% (95% CI: 82.4-97.6%). The specificity of WSI was determined to be 96% (95% CI: 91.0-100%), with an overall accuracy rate of 95% (95% CI: 89.5-100%). Substantial agreement was observed between the two screening intervals, indicating strong intra-observer reproducibility. The overall concordance rate for positive cases was 70%, with 2 false positives and 2 false negative identified. WSI demonstrates comparable performance to CLM in the detection of cervical abnormalities. However, the risk of false positives and the potential for missed diagnoses highlight the need for careful interpretation. Future research should focus on enhancing training for cytoscreeners and cytopathologists in the use of WSI according to the current standardised interpretation protocols. Additionally, there is a critical need for the standardisation of equipment and optimisation of scanning protocols to ensure consistency and reliability in WSI-based screenings.

***p*-Cresyl Sulfate Promotes Inflammatory Cytokine Expression in Foetal Human Osteoblasts: Implications for Pathological Bone Fragility**

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*p*-Cresyl Sulfate (*p*CS), a uremic toxin, has been associated with various adverse health outcomes, such as cardiovascular and renal complications. Specifically, *p*CS has emerged as a contributing factor to the increased prevalence of bone fragility. Emerging evidence suggests that *p*CS may exert its deleterious effects on osteoblast cells through its ability to induce inflammation. Inflammatory markers, Interleukin-6 (IL-6) and Interleukin-1β (IL-1β) have been implicated in the pathogenesis of these conditions yet have never been shown to be released by *p*CS-exposed osteoblasts. In this study, we aimed to investigate the effect of *p*CS on the pro-inflammatory cytokines IL-6 and IL-1β released by the Foetal Human Osteoblast 1.19 (fHOb 1.19) cells. The $IC_{30}$ of *p*CS was determined as 12 millimolar (mM), which was chosen over $IC_{50}$ as $IC_{50}$ resulted in detachment of most cells from the surface. After 48 hours of treatment, medium was collected and centrifuged. IL-6 and IL-1β were measured using enzyme-linked immunosorbent assays (ELISA). Experiments were performed in triplicate and analysed via one-way ANOVA. The results indicated that exposure to 12 mM of *p*CS lead to a significant increase in the production and release of both IL-6 (Control: 319.8 46.55, Treated: 2336.4 472.41 pg/mL) and IL-1β (Control: 4.38 3.03, Treated: 16.54 1.63 pg/mL) in fHOb 1.19 cells. An increase in inflammatory markers could contribute to enhanced bone breakdown and loss, potentially exacerbating bone fragility, in part, through the upregulation of inflammatory signalling pathways involving IL-6 and IL-1β in the presence of *p*CS.

**Establishing A New-Improved Transmission Electron Microscopy (TEM) Protocol for Lupus Nephritis Renal Biopsy Specimen in UPM**

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Transmission Electron Microscopy (TEM) is an essential and fundamental tool to assess the ultrastructure of renal pathologies and diagnose renal diseases. The TEM procedure has various technical problems, especially the extended duration technique, the adverse effects of the fixation process as its reagents are potentially toxic and carcinogenic and costly and the insufficient kidney biopsy dimensions. The TEM samples used are mostly limited to the fresh renal tissues samples, which can be problematic in cases with diagnostic dilemmas requiring formalin-fixed paraffin-embedded (FFPE) tissues and stained slides. In Malaysia, diagnostic TEM are only performed in limited centres and lacks expertise. The quality of TEM for diagnostic services is somewhat suboptimal and can be improved further. This research aims to improve and introduce new protocols in TEM (routine and immunogold) on different renal biopsy tissues (fresh, FFPE and tissues from stained slides) to optimally utilise TEM in renal pathology diagnostic services. We shall use biopsy-proven lupus nephritis cases as there are sufficient immune deposits in these cases and the patients are more likely to have a repeat renal biopsy. The expected output will improve the quality of TEM morphology, have a shorter technique duration, better safety profile and save overall cost. We expect to optimally utilise FFPE and tissues from stained slides to visualise its ultrastructural morphology in TEM for diagnostic as well as future research purposes. The research outcome is hoped to refine the current practice in renal diagnostic services and future research in renal pathology in UPM.