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The 20th Annual Scientific Meeting, College of Pathologists, Academy of Medicine of Malaysia; Bridging Frontiers: Transforming Laboratory Diagnostics for Tomorrow 5th-6th August 2024, Swiss-Belhotel, Kuantan, Pahang

K. Prathap Memorial Lecture: Is there a Role for Haematologists in the Emerging Field of Regenerative Medicine?

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Regenerative medicine is an emerging field which focuses on developing and applying new treatments to restore normal functions in diseased or damaged cells, tissue, and organs. Pathologists play crucial roles in this field in four major areas: 1. Understanding tissue growth and vascularization in health and diseases – to facilitate identification of biomarkers for diagnosis or prognostication, and druggable targets for prevention or treatment; 2. Evaluation and characterisation of tissue-engineered and regenerative medicine (TERM) products and their banking – to facilitate optimal regeneration from substandard repair outcomes; 3.Contributing to clinical trials as a vital member – to ensure regulatory compliance, perform imaging & molecular analysis at cellular, tissue and organ levels; 4. Contributing to ex vivo production of cells, tissues or organs and its automation under Good Manufacturing Practice environment. Among the pathologists, haematologists are particularly suited to play a significant role in driving the field by virtue of their prior expertise in stem cell biology and transplantation, cell characterisation and banking, and involvement in preclinical studies and clinical trials to ensure safety and efficacy of the new treatment approaches. Perhaps it is high time that the haematology fraternity would now consider a sub-specialty to train medical specialists as practitioners as well as guardians for safe and effective regenerative medicine practices.

Plenary Lecture 1: AI powered WES (Whole Exome Sequencing) – Making Sense out of Nonsense

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Artificial Intelligence (AI) has revolutionised pathology diagnostic landscape unveiling unparalleled possibilities not only for early detection, accurate diagnosis, personalised treatment strategies and prognosis. AI technologies include machine learning (ML) algorithms, deep learning (DL) models, and computer vision techniques, applied across various domains of diagnostic pathology. ML identifies patterns in data, while DL employs neural networks for intricate processing. Predictive modelling challenges, such as data labelling, are addressed by transfer learning (TL), leveraging pre-existing models for faster training. TL have great potential in diagnostics and genetics research of gene expression analysis, mutation detection, genetic syndrome recognition, and genotype-phenotype correlations. This presentation will discuss the profound impact of AI on congenital anomalies, genetics of disabilities and cancer and their management within the field of pathology. AI application in genomics, its challenges and AI dialogue with WES is addressed (variant calling, annotation & prioritisation & interpretation. Illumina e.g. of DRAGEN software methods of improved variant identification are highlighted. Invitae EMP (evidence modelling platform) which assess DNA variant, generates prediction and final variant classification will be discussed. Remarkably AI had shown its extraordinary potential starting even from fresh untreated tissue samples during surgery. AI enables a much faster tissue diagnosis way ahead of fresh frozen sections procedure. In neurosurgery where goal is to achieve maximum safe tumour removal within a tight lapsed time interval, delineation of tumour tissue from healthy tissue during surgery is particularly difficult, and in some cases residual tumour can therefore be observed after surgery. A new AI technology is able to more accurately detect the tumour boundary. Surgeons can thus examine tissue samples taken during surgery at the suspected tumour boundary for the presence of residual tumour tissue. Besides machine learning software using specific histological features recognises over 93 % of specific genetic tumour features within a few minutes. Future possibilities include increasing the domains of AI ie ML, DL, Computer Vision and data science. As AI evolves it is important to be always mindful of ethical considerations. WES Case reports in congenital anomalies & cancer are discussed.

Plenary Lecture 2: The Science of CAR-Immune Cell Therapy

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Cell-Based Immunotherapy has evolved from transplanting the whole immune system via haemopoietic stem cell transplantation as pioneered by the Father of bone marrow transplant, Dr Donall Thomas, in the seventies. Therapeutic approach is now single immune cell focused such as using T cells, NK cells, Macrophages or Dendritic cells. In fact, these immune cells are genetically engineered for more precise targets to achieve optimal results. One outstanding effort is the creation of artificial Chimeric Antigen Receptor (CAR) in these immune cells. CAR-T cells, CAR-NK cells and CAR-Macrophages are now available for clinical studies. In fact, to date 6 CAR-T cells are FDA approved for market authorisation for treating blood cancers. This lecture will focus on the development of CAR-T cells and their successful application in the treatment of blood cancers. There

conclusion, the administration of oral kalimate for hyperkalaemia treatment carries significant gastrointestinal risks, especially in patients with the aforementioned predisposing factors. Therefore, its usage warrants careful consideration and monitoring to prevent adverse events.

AP04. Patterns of Seminal Fluid Analysis In A Tertiary Centre In Sarawak

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Introduction: Routine seminal fluid analysis is a prominent and globally used laboratory investigation for the evaluation of male infertility. However, limited studies have been conducted to identify the pattern of seminal fluid parameters, especially in Malaysia. This study aimed to study the seminal fluid analysis (total seminal fluid volume, total sperm count, sperm motility and viability) pattern and determine the association of age, cigarette smoking and body mass index (BMI) with the seminal fluid analysis. *Materials and methods:* This retrospective study was conducted in an infertility centre in UNIMAS [Ethical Approval: UNIMAS/TNC(PI)/09-65/01(26)] for a year (1 October 2021 – 30 September 2022). A total of 127 patients' data were included in this study. The patients' data were recorded using a predesigned form and analysed using IBM SPSS version 28.0. *Results:* The mean age of the subjects was 35.26±5.61 years old. Overall, non-smokers were found to have lower seminal fluid volume and reduced sperm motility compared to non-smokers. A statistically significant correlation between age and the total sperm count (p=0.028) and between BMI and sperm viability (p=0.037) was observed in this study. However, no statistically significant correlations were observed between BMI and seminal fluid volume, total sperm count and total sperm motility. Similarly, no statistically significant correlation was noted between smoking and the seminal fluid analysis. *Discussion/Conclusion:* Our findings suggest a significant association between age and total sperm count, BMI and sperm viability, which in turn may affect the fertility status.

AP05. Unveiling A Rarity: Myoepithelial Neoplasms of Soft Tissue

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Introduction: Myoepithelial neoplasms of soft tissue represent a heterogeneous group of tumours classified as benign (myoepithelioma and mixed tumour) or malignant (myoepithelial carcinoma). *Case Presentation:* We report the case of a 42-year-old woman with no prior medical conditions who presented with a right arm mass persisting for 15 years. Despite its gradual increase in size, she remained asymptomatic. Examination revealed a substantial mass in her right arm, with well-defined borders, a soft to firm texture, and a smooth surface covered by normal skin. MRI of the right humerus showed a lobulated solid-cystic mass, predominantly cystic, at the postero-medial aspect of the proximal humerus, measuring 7.1 × 7.6 × 11.5 cm. The mass was surgically excised. Gross examination revealed a well-circumscribed, lobulated-brownish mass measuring 120 × 80 × 60 mm. Cut section showed a mixture of solid and cystic components, with the solid areas displaying a brownish surface without necrosis. The cystic areas were multiloculated, ranging from 1-5 mm in diameter, and contained brownish fluid. Microscopic and immunohistochemical analysis indicated features of a myoepithelial neoplasm of soft tissue. *Discussion:* Myoepithelial neoplasms of soft tissue exhibit a spectrum of morphologic patterns, making them difficult to distinguish from other neoplasms. There are no definitive criteria for malignancy for this tumour. While most morphologically benign myoepithelial neoplasms of soft tissue behave in a benign manner, there is approximately a 20% risk of local recurrence. Therefore, complete excision with clear margins is crucial. *Conclusion:* Recognition of this rare tumour is essential for planning management and predicting prognosis.

AP06. Renal Neuroendocrine Carcinoma: The Diagnostic Challenges of Small Round Blue Cell Tumours In The Kidney

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Introduction: Diagnosis of a small round blue cell tumour in the kidney can be challenging. The differential diagnosis includes primary renal neuroendocrine tumours (PRNETs), primitive neuroectodermal tumour (PNET) and nephroblastoma. We report a difficult case of small round blue cell tumour of the kidney. *Case presentation:* A 26-year-old lady who presented with generalised abdominal pain and vomiting. CT colonography shows incidental findings of renal mass which was subsequently confirmed by CT Abdomen and Pelvis. Gross findings show a well circumscribed solid tumour at the lower pole measuring 65 × 56 × 40 mm with a homogenous tan cut surface. Microscopy shows small round blue cells and the immunohistochemical studies show positive staining for neuroendocrine markers, CD99 and NKX2.2 while negative for FLI1 and ERG. The Ki67 proliferative index is 20-30% which leads to a diagnosis favouring neuroendocrine carcinoma. *Discussion and Conclusion:* PRNET is a rare entity and more profoundly scarce in the genitourinary system. The difficulty in diagnosing PRNET is due to significant histological overlap with its differentials with minimal differences in immunohistochemical staining. NKX2.2 immunopositivity can significantly support the diagnosis of PNET. However, PRNETs also exhibit variable NKX2.2 expression. Hence, NKX2.2 expression should be interpreted