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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

ANATOMIC PATHOLOGY

AP01. Rare Entity of Mesonephric-like Endometrial Carcinoma: A Diagnostic Challenge

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Introduction: Mesonephric-like adenocarcinoma (MLA) is a rare subtype of endometrial cancer which accounts for 1% of all endometrial tumours. We report a case of MLA with initial diagnosis of endometrioid adenocarcinoma. *Case Presentation:* A 44 year-old lady with dysmenorrhoea underwent TAH with clinical impression of fibroid without a formal CT scan. Based on histomorphological features and immunohistochemistry diagnosed as endometrioid adenocarcinoma. Subsequently completion surgery ensued and bilateral ovaries and pelvic lymph nodes were removed. Characteristic histomorphological features of the tumour with extensive endometriosis and positive tumour cells for GATA 3, ER, TTF 1 with inverse staining pattern and CD10 luminal staining with expert opinion from consultant gynaecological pathologist a final diagnosis of uterine MLA was concluded. *Discussion:* MLA are high grade carcinoma with a low grade morphology and usually seen in post-menopausal age groups. The diagnostic challenges of MLA was age and limitation of available immunohistochemistry and molecular tests in our centre. After reviewing the initial hysterectomy specimen, we found the tumour arising from uterine wall with mixed histological patterns and areas showing small glands and tubules with luminal eosinophilic colloid-like material in the pelvic lymph nodes. Diagnostic stains are required and outsourced. We also required expert opinion due to the rarity of the occurrence. *Conclusion:* The diagnosis of rare carcinoma is established by characteristic histomorphological features which requires a thorough examination of the entire resected specimens with the help of relevant immunohistochemistry and experienced pathologist. It is important to make a correct diagnosis due to the aggressive behaviour of the tumour.

AP02. Uncommon but Crucial: Neuroma of Appendix as a Rare Aetiology of Acute Appendicitis

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Introduction: Acute appendicitis is the most common surgical emergency globally. Neuroma of the appendix, a rare neural-origin tumour, often mimics the symptoms of acute appendicitis. *Case Presentation:* We report a case of a 39-year-old female who presented with sudden right lower abdominal pain associated with vomiting, reduced oral intake, and nausea. Examination revealed right iliac fossa tenderness, positive rebound tenderness, and a positive Rovsing's sign. Laboratory tests showed leukocytosis with neutrophilia, and abdominal ultrasound indicated acute appendicitis. An appendicectomy was performed, revealing an inflamed retrocecal appendix forming a mass clump with the tip embedded in the cecum. Microscopically, the appendiceal lumen was obliterated by uniform spindle cell proliferation in a myxoid background, with mild neutrophilic infiltration at the serosa. Immunohistochemistry revealed spindle cells positive for S100 and negative for SMA. The final diagnosis was neuroma of the appendix with serositis. *Discussion:* Acute appendicitis is a common surgical emergency, typically resulting from luminal obstruction. While the common causes include fecaliths, lymphoid hyperplasia, and infections, rare etiologies such as neuroma of appendix are seldom reported. Neuroma of appendix are benign nerve tissue tumours within the mucosal layer, often associated with genetic syndromes but can occur sporadically. Their presence in the appendix leading to acute inflammation presents a unique diagnostic challenge and clinical interest. *Conclusion:* Neuroma of appendix, though rare, should be considered a potential cause of acute appendicitis. Recognition of this entity is crucial for pathologists and surgeons to ensure accurate diagnosis and appropriate management.

AP03. Uncommon Side Effect Of A Commonly Prescribed Oral Kalimate (Calcium Polystyrene Sulfonate): A Case of Kayexalate Induced Gastropathy

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Introduction: Calcium polystyrene sulfonate (CPS), commonly known as oral kalimate, is a resin utilised in clinical settings to address hyperkalaemia by binding potassium and facilitating its elimination through faeces. However, its oral administration is linked with gastrointestinal mucosal injuries, which can escalate to severe complications such as bowel ischaemia and perforation, predominantly affecting the colon. While upper gastrointestinal involvement is rare, it's not unheard of. *Case Report:* This report presents the case of a 70-year-old Malay man with underlying chronic kidney disease (CKD), who underwent oesophagogastroduodenoscopy (OGDS) for anaemia investigation to rule out upper gastrointestinal bleeding. The endoscopic examination revealed focal gastric erosion with a suspicion of fungal lesion at the fundal area. Histopathological analysis of biopsy specimens from the fundus exhibited features of reactive gastropathy induced by Kayexalate, characterised by the presence of rhomboid basophilic crystals with a mosaic pattern embedded within the mucosal layer. Further history revealed recent ingestion of oral kalimate prescribed for hyperkalaemia within 3 days prior to OGDS procedure. *Discussion:* Hyperkalaemia, a critical electrolyte imbalance, necessitates prompt intervention. Oral kalimate has been a longstanding treatment option for mild to moderate hyperkalaemia. However, it can induce gastrointestinal injury through vascular vasospasm and inflammatory reactions especially in patients with predisposing factors like underlying chronic kidney disease, uraemia, gastropathy, ileus, hypotension, or immunosuppressed. *Conclusion:* In