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BREAST POSTER PRESENTATIONS

P065 Real world PIK3CA variant prevalence -- a single centre retrospective analysis

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Background: The SOLAR-1 trial showed that alpelisib--fulvestrant extends progression free survival in patients with PIK3CA variants in hormone receptor (HR) positive, HER2 negative breast cancer previously receiving endocrine therapy 1 The reported PIK3CA variant frequency is approximately 40%2. With the recent NICE approval of alpelisib, we sought to determine the real-world PIK3CA variant prevalence to gauge the eligible patient cohort for treatment.

Method: All patients with advanced HR positive HER2 negative breast cancer receiving or having previously received CDK4/6 inhibitors at our centre were tested for PIK3CA at the regional genomics hub. This data was collected and analysed by the presence of a variant, the nature of it and its potential sensitivity to alpelisib, based on the SOLAR-1 identified 11 hotspot variants.

Results: To date, 25 eligible patients were tested, with 13 harbouring a variant, giving a frequency of 52%. Two patients had variants outside of the 11 hotspot areas and are therefore of uncertain clinical significance. Notably, one patient had two coexisting variants, one of which being scarcely documented previously.

Conclusion: In our cohort, a markedly higher PIK3CA variance rate was found. Combining this data with that of other centres will be useful to establish the representative frequency of PIK3CA variants in the United Kingdom. This data would then accurately inform service demands and needs. Further analysis of rare PIK3CA variants is needed to understand their clinical and therapeutic significance.

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P066 Implementation and evaluation of breast CBCT in a radiotherapy department

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Background: Historically, breast radiotherapy required two different planning and delivery techniques depending on nodal involvement: breast-only treatments used opposing single isocentre tangential beams whereas nodal fields were treated with a separate isocentre field matched to the tangentials. A third technique was introduced in response to National Institute for Health and Care Excellence (NICE) guidelines (2018) for internal mammary nodal (IMN) involvement. Multiple treatment techniques necessitated distinct complex imaging and treatment protocols with varied tolerances, causing confusion and leading to incidents, therefore standardisation was needed.

Purpose/Application: The aim was to introduce a new, all-inclusive breast radiotherapy technique, benefitting the safety and experience of our patients using the technological capability to treat nodal regions alongside the breast as one volume where necessary. This new technique was to have a single isocentre regardless of nodal involvement as well as cone beam CT image verification to bring breast imaging in line with protocols for other radical treatment sites. Compromises were made between planning and treatment delivery, ensuring acceptable dose distributions; an isocentre position allowing plan deliverability and reproducibility of position which can be verified with one imaging modality throughout.

Summary of presentation:

1. Previous breast treatment techniques - planning/delivery technique and limitations
2. What we wanted to achieve - an IMN technique meeting NICE guidelines, a monoisocentric nodal technique and consistent imaging across the board
3. Benefits - safer, standardised positioning and verification, more robust planning and future proofing
4. Implementation
5. Audit results
6. Lessons learned
7. Future projects

1. National Institute for Health and Care Excellence. (2018). Early and locally advanced breast cancer: diagnosis and management (NICE guideline NG101)

P067 Clinical background factors that impact the performance of radiography advanced practitioners

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Background: Accurate mammographic image interpretation forms the basis of an effective breast screening programme. A high standard of image interpretation maintains optimum cancer detection and the ability to differentiate malignant from benign appearances (1,2). Understanding the factors that impact upon reader interpretation skills is therefore critically important and whilst a plethora of data is available for radiologists, much less is known for reporting UK radiographers in the UK. For the first time, this study will identify clinical factors that account for performance variations within UK Radiography Advanced Practitioners (RAP).

Method: A test set of 60 mammograms with known outcomes were interpreted by 22 UK RAP's using the DetectedX platform. For each reader, lesion sensitivity and Jacknife free-response receiver operating characteristic (JAFROC) values were established. Student's T or Mann-Whitney tests were used to explore the impact of clinical background on image interpretation accuracy.

Results: Lesion sensitivity correlated against the weekly volume of reads >100 (<0.0001). JAFROC curves demonstrated significant difference between weekly volume reads ($P \leq 0.01$) and reliance of prior images ($P \leq .0001$). Benchmark performance values are indicated.

Conclusion: Factors that impact the performance of RAP's have been identified. Strategies can be explored to optimise image interpretation and set values for the future of radiographic reporting. This will develop a pioneering evidence base on which RAP standards can be derived.

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P068 Single centre breast medical oncology service evaluation

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Background: With improved breast cancer outcomes, service demands have increased (1). Particularly, survival has drastically improved for metastatic patients, meaning longer treatment times. This creates particularly acute challenges in centres serviced by a sole consultant, as was the case here, constraining clinical and research service provision. This reinforces the need to optimise patient pathways, improve recruitment and drive innovation in redesigning service models. By conducting a comprehensive service evaluation, a baseline patient cohort was established, allowing future service needs to be accurately mapped, informing operating policy.

Methods: All patients seen between 12/04/22-13/09/22 at a single centre breast medical oncology clinic were included. A retrospective review of clinic and prescription records was conducted to obtain this data. Patients were then classified by stage, receptor status, treatment duration and intent.

Results: In this period, 152 patients were seen. 77 had metastatic disease and 75 curative. Amongst curative patients 66.7% were HR positive compared to 81.3% of metastatic patients. 28% of curative and 26.7% of metastatic patients were HER2 positive. 20% of curative and 10.7% of metastatic patients were triple negative. The median treatment durations were 6 months for curative and 23 months for metastatic patients.

Conclusion: The significantly longer treatment duration for metastatic patients clearly demonstrates the increasing service demands. This creates a need to adapt our workflow through making use of allied professionals to reduce waiting times. This data will inform protocols for clinical assessments for different patient subgroups. It will also inform a requisite local standard for staffing levels.

1. Palmer, C. and Cumming, I. (2017) Cancer Workforce Plan. Health Education England

P069 Evaluation of multi-modal breast imaging using x-ray mammograms and thermal images for better interpretation: a pilot study

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Background: X-ray mammography is usually inconclusive in women with dense breasts where thermal imaging can add value as it detects abnormal physiological activity across breast densities. In this pilot study, we evaluated an AI-based multimodal system that analyzes thermal images to identify abnormal thermal activities and creates annotated mammographic images highlighting sectors containing suspicious hotspots.

Method: The study included 28 women for whom both mammography and thermal images were captured. 21 of them were diagnosed with breast malignancy. Interpretation results of original mammography images were compared with that of sector annotated mammography images. To remove bias, in the first phase, the interpreter was presented with raw mammograms of the first 14 women and sector marked mammography of the last 14 women. After a washout period of 30-days, the groups were swapped for the second phase. The time for interpretation was noted.

Results: Interpretation of raw mammography images resulted in 17 True Positives (TP), 1 False Negative (FN), 2 True Negatives (TN) , 1 False Positive (FP) and 7 inconclusive cases. Interpretation of annotated mammograms highlighting sectors containing suspicious hotspots resulted in 19 TP, 0 FN, 4 TN, 1 FP and 4 Inconclusive cases. Multimodal annotations improved interpretation accuracy by converting 4 inconclusive cases to 2 TP and 2 TN. One FN became inconclusive. Use of annotated mammograms saved interpretation time by 1 minute per scan.

Conclusion: This pilot study demonstrated the potential of an AI-based multimodal imaging tool that combined structural and functional breast imaging to improve interpretation accuracy and time.

P070 Eponymous syndromes affecting the breast: A pictorial review

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Background: Eponymous syndromes are often named after the person who first described the condition. With the current trend being towards descriptive names, many of these eponyms persist due to historical precedent and familiarity (Desikan et al, 2017). Numerous eponymous syndromes affecting the breast exist and it is important for breast imagers to be aware of these.

Purpose: To present an overview of and illustrate eponymous syndromes affecting the breast To provide historical background on the origin of the eponym To highlight those cases where eponymous syndromes have been renamed and why

Summary of content: In this pictorial review, we present a range of eponymous syndromes. We discuss features, its impact upon the breast and provide interesting historical background on the person who first described the condition. Klinefelter syndrome: 47XXY chromosome, gynaecomastia and infertility. Higher oestrogen levels increase breast cancer risk. Named after Harry Klinefelter whose name appeared first on the published paper. Lhermitte-Duclos syndrome: PTEN-mutation-related cerebellar-gangliocytomas. Breast, endometrium and thyroid imaging for cancers is also vital. Lhermitte was deeply religious and studied about demonic possession. The classic 'Lhermitte sign' suggestive of demyelination is also named after him (Louis, et al 2021). Mondor disease: Cord-like painful mass due to venous thrombophlebitis. Mammography demonstrates superficial, tubular, beaded densities. Henri Mondor was an accomplished doctor and historian of French literature (Kyle et al, 1986) Kikuchi syndrome: Benign, necrotising lymphadenitis with cervical node enlargement and B-symptoms. Masahiro Kikuchi self-diagnosed anaplastic large-cell lymphoma using his own biopsy. Despite this, he continued to work for 4 years until his death (Fujimoto et al, 1972)

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P071 Breast cancer in young- clinical and mammographic outcomes

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Learning Objective: Breast cancer can occur at any age. Risk factors include personal history of breast cancer or a high-risk lesion (on biopsy), positive family history of breast cancer or genetic syndrome, history of radiation therapy to chest, certain genes, and Ashkenazi Jewish ancestry. We sought to highlight features of breast cancers detected on mammography in young women under 40.

Background: We retrospectively reviewed medical records of women under 40 for the period of last 2 years. Information about family histories of breast cancer was noted. Post-operative and mammoplasty cases were excluded. Digital mammographies were interpreted by a specialist or generalist with more than 10 years of experience. Breast parenchymal densities, nodule features, micro-calcification, and distribution were recorded. Biopsy findings were documented.

Findings: Out of 47 cases, 9 cases had breast cancer. Most (6/9) were having negative family histories. The majority (6/9) were found to have nodules (more than 2 cm in size, with additional features). Many of them (5/9) were reluctant (shy) to get medical advice, not aware of danger signs, or were afraid to get medical advice due to cultural limitations, while few could not find dedicated breast care facilities.

Conclusion: Diagnosing breast cancer in younger women can be difficult because of higher breast tissue density and routine screening is not recommended. Young women may ignore warning signs, leading to delayed diagnosis. Breast cancer awareness and early access to care should be promoted.

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