



ultrasound.

**Methods:** 77 cone-beam computed tomography (CBCT) images from 11 patients with cervical cancer who had undergone ultrasound scans prior to radiotherapy (group A) and a group of 11 patients who had been previously treated without ultrasound (group B) were fused with the planning CT scans. The change in uterus fundus position on CBCT scans compared to the planning CT scans was quantified. Linear regression was used for comparison.

**Results:** The mean and range of movement of the uterine fundus in group A are smaller but not significantly different than group B (superior / inferior : group A: 0.01 to 1.98 cm, mean 0.54 cm, group B 0.02 cm to 3.61 cm, mean 0.71 cm; anterior / posterior group A 0 cm to 2.50 cm, mean 0.62 cm; group B 0.03 cm to 2.59 cm, mean 0.72 cm). Both groups showed significant increase in uterus motion over the course of radiotherapy.

**Conclusions:** Confirming bladder size is similar to planned with ultrasound has resulted in a small reduction of uterus movement. Further work is required to investigate other methods of managing uterus motion.

1. Eminowicz, G. et al. (2017) Pelvic organ motion during radiotherapy for cervical cancer: understanding patterns and recommended patient preparation. *Clinical Oncology*. 122(1), 116-121.

2. Lewis Bestwick, G.L. (2016) Inter-fractional uterine and cervix motion during radiotherapy for cervix cancer. M.Sc. thesis. Sheffield Hallam university.



## BREAST POSTER PRESENTATIONS

### **P048 An audit of the chabner bra breast immobilisation device for large breasted patients who require external breast radiotherapy treatment**

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**Introduction:** Large breasts commonly present both technical and skin toxicity radiotherapy challenges and there is currently no standardized breast immobilisation practice in the UK. Specifically designed radiotherapy bra's have recently been developed to address such challenges whilst improving patient experience and dignity.

**Method:** To audit the impact of the Chabner bra (CB) on radiotherapy breast immobilisation for large breasted patients with greater than 1.5cm breast tissue overhang in any direction. The following quantitative metrics were collected for 15 patients with no immobilisation device and 15 patients with the CB: average field length, reproducibility and skin toxicity. For patients wearing the CB, 2 additional CT scans were scheduled (Day 0 and between fractions 10-15).

**Results:** Average field length was 2.1cm less for those patients who received radiotherapy with the CB. When compared to the planning CT scan, the CT day 0 average variation was 0.7cm which increased to 0.8cm at the CT fraction 10-15. Twice as many verification images were taken for patients with the CB. Average discrepancy of 0.57cm and 0.87cm was measured for patients without and with the CB respectively. RTOG2.5 skin toxicity was recorded in 3 patients without the CB and 4 patients with the CB.

**Conclusion:** The use of a specifically designed radiotherapy bra can significantly reduce field length without increasing skin toxicity. Whilst reproducibility with the CB was slightly inferior, it still met local imaging protocols. Inadequate CB staff training could have attributed to the variations in reproducibility.

1. Montgomery, L., Flood, T. and Shepherd, P. (2020) A service evaluation of the immobilisation techniques adopted for breast cancer patients with large and/or pendulous breasts receiving external beam radiotherapy. *Journal of radiotherapy Practice*. 26 (1), 1-6. 2. Probst, H., Bragg, C., Dodwell, D., Green, D. and Hart, J. (2014) A systematic review of methods to immobilise breast tissue during adjuvant breast irradiation. *Radiography*. 20 (1), 70-81.



**P049 A comparison of on-treatment breast swelling between 5 fraction and 15 fraction radical radiotherapy treatments to the breast**

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**Background:** Patients referred for radiotherapy to the breast are commonly treated with a dose of 40.05Gy over three weeks. Treating a defined group of patients with a dose of 26Gy over 5 days was introduced due to the COVID-19 pandemic, based on encouraging data from the FAST-Forward trial, in order to reduce patient hospital visits (1).

National discussion between the Image Guided Radiotherapy Advanced Practitioners indicated that an increase in breast swelling was noted for those patients treated over 5 days.

**Purpose:** The purpose of this poster is to discuss the actual impact this change in regimen has had on breast swelling. If breast swelling is identified to be a significant issue, further investigation will be needed to identify the dosimetric impact and at what point a re-plan would be required.

**Summary:** All patients (n=82) had online pre-treatment image verification using 2DMV planar imaging. Patients receiving radiotherapy over 5 days (n=41) had daily image verification and those patients receiving 15 treatments (n=41) over three weeks had image verification days 1-3 and weekly thereafter.

No significant difference in the number of patients suffering breast swelling was noted between the treatment arms (n=10 for both treatment arms).

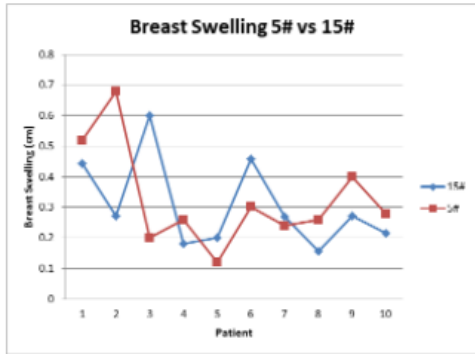


Figure 1: Results for the 10 patients with breast swelling

Chart Title	Swelling (cm)
Overall population <b>mean</b> swelling 5 fractions	0.33
Overall population <b>mean</b> swelling 15 fractions	0.31
Population <b>systematic</b> swelling 5 fractions	0.16
Population <b>systematic</b> swelling 15 fractions	0.14

Table 1: Swelling results for the 10 patients suffering swelling

Table 1 highlights the overall population mean swelling and the population systematic swelling for the 10 patients where swelling was present. T-test analysis shows no statistical significance between the two groups (p=0.4).

**Conclusion:** Data indicates that radiotherapy delivered over 5 days does not cause an increase in breast swelling and no further work is required.

1. Coles CE, Aristei C, Bliss J et al (2020) International Guidelines on Radiation Therapy for Breast Cancer During the COVID-19 Pandemic. Clinical Oncology Vol 32 Issue 5 pages 279-281

**P050 Hypofractionated breast radiotherapy implementation as an economic and effective alternative to Brazilian healthcare**

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**Background:** Hypofractionated breast radiotherapy consists of the administration of a larger daily radiotherapy dose in a shorter period of time when compared to the international standard treatment, demonstrating non-inferiority results at follow-up. The satisfactory results presented by the British trials START (2008) and most recently FAST-Forward (2020), support this as a rising option of radiotherapy schedule.

**Purpose of poster Outline:** Brazil is a country of continental proportions, and although it has a free and unified health system, the population faces obstacles in accessing such services, such as long waiting times, especially in areas highly dependent on infrastructure and technology such as radiotherapy. In some regions, such as the Amazon, geographic issues including long territorial distances, rivers as the main transport routes, and the concentration of health services in the capital also directly impact healthcare access. In addition to reducing the time and costs of treatment as demonstrated previously in the British trials, implementing a hypofractionated breast radiotherapy schedule could contribute to the Brazilian reality by reducing the logistics-related difficulties: since fewer visits to the hospital would be expected, the patient would have less personal expenses related to transportation, which would finally culminate in increased treatment adherence. Such a therapeutic model could also contribute to the reduction of waiting time.

**Summary of content:** Brazilian healthcare system could potentially benefit from the adoption of the hypofractionated breast radiotherapy model, both by reducing costs to the health system and by increasing patient adherence to treatment, due to reduced treatment time and transportation-related costs.

1. Adrian M. B. et al. (2020) Hypofractionated breast radiotherapy for 1 week versus 3 weeks (FAST-Forward): 5-year efficacy and late normal tissue effects results from a multicentre non-inferiority, randomised, phase 3 trial. The Lancet 395, 1613-1626 Elsevier BV. 2. Bentzen, S.M. Agrawal, R.K. Aird, E.G. et al. (2008) The UK Standardisation of Breast Radiotherapy (START) Trial A of radiotherapy hypofractionation for treatment of early



breast cancer: a randomised trial.. Lancet Oncol; 9: 331-341. 3. Whelan, T.J. Pignol, J.P. Levine, M.N. et al. (2010) Long-term results of hypofractionated radiation therapy for breast cancer.. N Engl J Med; 362: 513-520.

#### **P051 A case of multiple myeloma with plasmacytoma in the breast**

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**Background:** Breast involvement by Multiple Myeloma is rare and the diagnosis is difficult because of the non-specificity of clinical and radiological features.[1] To our knowledge, only 20 patients with such involvement have been reported in the literature[2]. Clinical and radiological features are similar to other epithelial and lymphoproliferative breast malignancies and the diagnosis frequently depends on biopsy[2].

**Purpose of the poster:** To provide the radiological findings seen in a synchronous presentation of osseous multiple myeloma as well as breast plasmacytoma, as reported in 7-19% of patients. {3}

**Summary of content:** A 41 years old pregnant lady had been attended the hospital for ongoing lower back pain which was thought to be pregnancy-related. Post-delivery, MRI spine demonstrated diffuse bone marrow infiltration, vertebra plana configuration of L1 with large circumferential paraspinal, and extradural mass causing compression of the distal cord and conus. A staging CT scan confirmed the same findings, as well as multiple soft tissue lesions in both breasts. The patient was admitted urgently and posterior decompression and fixation of L1 and L2 were performed. The case was discussed in multi-specialty MDTs. A bone marrow aspirate and paravertebral mass biopsy confirmed plasmacytoma and deposits of plasma cell myeloma. The patient was referred to the breast unit, where mammograms and ultrasound were performed followed by biopsies of the suspicious bilateral breast masses which revealed plasma cell neoplasm. In conclusion, breast plasmacytoma is a rare manifestation of multiple myeloma. The proper diagnosis changed the disease management in this case, and chemotherapy was initiated.

1.Heba O. E. Ali,1 Zafar Nasir,2 and Ahmed M. S. M. Marzouk 2019 Multiple Myeloma Breast Involvement: A Case Report HINDAWI Journal Volume 2019 | Article ID 2079439 | <https://doi.org/10.1155/2019/2079439> 2.Antunes D, Coutinho M, Marques JC (2013) Breast Multiple Myeloma. OMICS J Radiology 2:124. DOI: 10.4172/2167-7964.1000124 3.Thais Rodrigues da Cunha Fischer1 \* Fabiana Higashi1 Edvan de Queiroz Crusoe Bilateral breast plasmacytoma: a clinical case report Rev. Bras. Hematol. Hemoter. vol.38 no.2 São Paulo Apr./June 2016

#### **P052 Staging CT in Newly diagnosed breast cancer: Are we following the guidelines**

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**Background:** Staging CT is a valuable test in the journey of patients with breast cancer. Increasingly, oncologists are requesting CT staging on all patients prior to NACT. This approach contradicts recommended guidelines. In addition to the cost implication of such approach, there is the added stress to women waiting for results and extra tests generated. We reviewed our practice and compared it to the European Society of Medical Oncology (ESMO) guidelines. Standard: ESMO recommends Staging CT in: 1-Patients with Clinically positive Nodes 2-Tumours 5 cm or more (T3) 3-Tumours with aggressive biology 4-Clinical evidence of metastasis

**Method:** Retrospective review of staging CT on patients with newly diagnosed breast cancers between April 2019-2020. Indications for staging CT were compared to ESMO guidelines to assess compliance. 100% compliance is expected.

**Results:** Our study cohort comprised 70 patients with an age range (29-89 Years). 86% were compliant with ESMO guideline. Metastatic disease was suggested in 14 patients and confirmed in 9 patients ( 2 patients with T3 tumours and positive nodes, 7 patients with tumours of aggressive biology and positive nodes). Five patients had false positive results and generated unnecessary follow up scans including three CT scans, one MRI and one PET-CT.

**Conclusion:** Our audit shows 86% compliance with ESMO guidelines. Metastases diagnosed in 9/70 ( 12.8%) patients. The highest rate of metastatic disease is in T3 tumours.

#### **P053 Adenoid cystic carcinoma of the breast: A rare entity**

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**Background:** Adenoid cystic cancers are tumours most commonly known for their location in the salivary glands. These are however also found in the nasopharynx, trachea, uterine cervix, skin, lungs, and kidneys as well as the breast. These comprise only 0.1% of all breast cancers.<1>They usually present as a slowly growing breast mass, they have a much more favourable prognosis as compared to other breast cancers.<2> This is also in contrast to the adenoid cystic carcinomas in salivary glands. Metastasis to the lymph nodes or distant organs is rare and wide local excision and radiotherapy with sentinel node biopsy is considered adequate.

**Purpose of poster:** We present a case of a malignant adenoid cystic carcinoma and review the current literature to



increase awareness of its imaging findings, presentation, and appropriate management and follow up.

**Summary of content:** We present an overview of the clinical presentation, imaging findings including mammography, ultrasound and breast MRI and the role of MDT in planning further management of these patients.

1. Kulkarni N, Pezzi CM, Greif JM, V Suzanne Klimberg, Lisa Bailey, Soheila Korourian, et al. Rare breast Cancer: 933 adenoid cystic carcinomas from the National Cancer Data Base. *Ann Surg Oncol* 2013 Jul;20(7):2236-41. 2. Wang S, Li W, Wang F, et al. 36 cases adenoid cystic carcinoma of the breast in China: comparison with matched grade one invasive ductal carcinoma-not otherwise specified. *Pathol Res Pract* 2017Apr; 213(4):310-5.



## CARDIAC / CHEST & LUNG POSTER PRESENTATIONS

### **P054 Incidence of indeterminate computed tomography pulmonary angiogram (CTPA) examinations during first wave of COVID-19 pandemic in a tertiary center**

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**Aim:** To compare the incidence of indeterminate CTPAs between COVID-19 and pre-pandemic periods.

**Methods:** All consecutive CTPAs performed at King's College Hospital from A+E/inpatient settings were evaluated in two periods: from 01/3/2019 to 15/04/2019 and from 01/03/2020 to 15/04/2020. Positive SARS-CoV-2 RT-PCR results were recorded. One observer scored CTPAs for presence/absence of pulmonary embolism (PE), motion artefact and attenuation of the main pulmonary artery (MPA). Motion artefact was recorded when it was deemed detrimental to diagnostic accuracy. Pearson Chi-squared test was performed to compare motion artefact in COVID-19 vs non-COVID-19 groups.

**Results:** In the pre-pandemic period, there were 158 CTPAs (N=158, 60 males, median age=59). 17% had PE (n=27/158). Motion artefact and inadequate contrast enhancement were documented in 11.4% (n=18/158) and 12% (n=19/158) respectively. In the pandemic period, there were 238 CTPAs (N=238, 122 males, median age=57). 47.1% (n=112/238) had positive RT-PCR tests. 25.6% had PE (n=61/238). Motion artefact and inadequate contrast opacification were recorded in 39.9% (n=95/238) and 5.9% (n=14/238) respectively. CTPA examinations increased by 50.6% during the pandemic with 8.6% increase in positive PEs. In patients with COVID-19, there was significantly higher motion artefact (25.2% (n=60) vs. 14.7% (n=35), P<0.001).

**Conclusion:** There is high demand for CTPAs with higher incidence of PE during the COVID-19 pandemic. Acquiring diagnostic CTPAs in severe COVID-19 can be challenging and the high incidence of indeterminate CTPAs can have adverse clinical outcomes. Careful consideration of factors such as better imaging equipment and enhanced operator training is needed to improve the diagnostic image.

1. Jones SE, Wittram C. (2005) The indeterminate CT pulmonary angiogram: imaging characteristics and patient clinical outcome. *Radiology* 2005; 237:329-337.

### **P055 Evaluating the difference in prevalence of acute pulmonary embolism on CT pulmonary angiograms for COVID-19 positive patients between the first and second waves of COVID-19**

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**Background:** The first wave of the COVID-19 pandemic (April 2020) resulted in many escalations to critical care (CC). Computed Tomography Pulmonary Angiography (CTPA) excludes pulmonary embolism (PE). The cross-infection risks of CTPA scans were justified following a consultant clinician to consultant radiologist discussion at our institution. Evidence subsequently emerged of an increased risk of PE in COVID+ patients and the requirement for a consultant-to-consultant discussion was dropped prior to the second wave (October 2020).

**Purpose:** To evaluate the number of CTPA scans and positive rates for PEs during the first and second waves and establish whether the risks of cross contamination are justified.

**Methods:** A retrospective, single centre study evaluated 102 COVID+ patients. CTPAs for COVID+ patients for 21 consecutive days of each wave (from 1st April 2020 and from 15th October 2020) were reviewed for the presence of PEs. Gender, age and referral source were recorded.

**Results:** 48% of COVID+ patients had PEs on CTPA during the first wave with 16 of 33 patients referred from CC. Only 10% of COVID+ patients had PEs in the second wave with only 5 of 79 patients from CC.

**Conclusion:** The high positive pick-up rates for PEs in the first wave suggest that CTPA was underutilised. The greatly reduced pick-up rates of PE in the second wave suggests overutilisation of CTPA or earlier anticoagulation of COVID+ patients. Scanning more COVID+ patients puts staff and other patients at an indeterminately increased risk of cross-infection. Can we better risk stratify COVID+ patients?