

## Anne Hollman Medal Abstracts 2017

**Diagnostic yield of percutaneous transhepatic biliary biopsy forceps in the diagnosis of obstructive jaundice.**

**Presenting author:** Gordon T. Royal Infirmary of Edinburgh\*.

**Purpose:** To determine the safety and efficacy of our initial experience of introducing the technique of biliary biopsy forceps (Cook Medical) during percutaneous transhepatic biliary drainage (PTBD) for obtaining diagnostic tissue.

**Materials and Methods:** A retrospective audit of all biliary biopsy cases during an 18 month period (June 2015- November 2016) when this technique was introduced at our centre\*. Patient demographics, site of obstruction, operator, complications and histopathology result were analysed on the hospital's Electronic Patient Record. Follow up surgery, clinical outcome and/or imaging was also documented (median follow up 12 months).

**Results:** 26 patients underwent a biliary biopsy procedure (14 male). All 26 cases were technically successful with no complications related to the biopsy. A mean of 2.8 (2-4) samples were acquired. 17 hilar and 9 distal CBD lesions were targeted. 15 (58%) specimens yielded a diagnosis of malignancy or "highly suspicious" of malignancy. 3 samples demonstrated non- malignant tissue, 1 "atypia" and 7 (27%) were non-diagnostic (insufficient or crushed sample). There was a trend towards non- diagnostic samples being more likely from the distal CBD lesions (3 out of 9). Of the 3 non malignant tissue samples, one patient had proven adenocarcinoma on subsequent endoscopic ultrasound biopsy and the other 2 cases had imaging convincing of malignancy (one patient now deceased). Non- diagnostic samples were evenly spread through the 18 month period, but may be operator dependent.

**Conclusion:** Our initial experience of biliary biopsy forceps demonstrates acceptable diagnostic yield with a high procedural success rate and no associated complications.

## **Associations between the ultrasound features of invasive breast cancer and breast cancer specific survival**

**Presenting author:** Brooke Lawson. Ninewells Hospital Dundee.

**Aim:** Pre-operative prognostic information is useful when treating women with breast cancer especially with regard to assessing the appropriateness of neoadjuvant chemotherapy. The aim of this study is to identify associations between the ultrasound (US) features of invasive breast cancer and breast cancer specific survival (BCSS).

**Methods:** 287 consecutive women within a single breast service (mean age 63 yrs) with US visible invasive breast cancers were documented prospectively between January 2010 and December 2012. The US features of the lesions were evaluated retrospectively from the recorded images according to the BI-RADS US lexicon by a breast radiologist blinded to outcomes. Survival, including cause of death, was ascertained from local and national sources. Kaplan-Meier survival curves were generated and statistical significance ascertained using the Log-Rank test.

**Results:** Twenty seven breast cancer deaths and 31 non-breast cancer deaths occurred in the sample. Mean follow-up in those alive is 5.5 years. Distal acoustic enhancement was associated with a 72% 5 year BCSS compared to 93% and 97% for those with distal shadowing or no distal effect ( $p < 0.0001$ ). Skin involvement (either direct invasion or skin thickening over the mass) was associated with 78% 5 year BCSS compared to 94% in women without skin involvement ( $p = 0.0001$ ). Women in the highest tertile of US lesion diameter had a 5 year BCSS of 83% compared to 96% for women in the middle and smallest tertiles ( $p = 0.0004$ ). Mass shape, echogenicity and margin characteristics, orientation or BIRADS score were not associated with BCSS.

**Conclusion:** Distal acoustic enhancement and skin involvement at US have strong associations with breast cancer death and should be taken into account with lesion size and other conventional prognostic features when managing invasive breast cancer.

## Development of novel computed tomography and genetic diagnostic criteria for lobar intracerebral haemorrhage associated with cerebral amyloid angiopathy

*Anne Hollman Medal Winning Abstract \*\*\*\*\**

**Presenting author:** Mark Rodrigues. Royal Infirmary of Edinburgh.

**Background:** Identifying lobar intracerebral haemorrhage (ICH)-associated with cerebral amyloid angiopathy (CAA) is important due to higher risk of recurrent and antithrombotic ICH. As ICH is commonly diagnosed by computed tomography (CT), we aimed to develop CT-based diagnostic criteria for CAA-associated lobar ICH.

**Methods:** We identified adults with first-ever ICH diagnosed by CT in a prospective, population-based cohort study who underwent research post-mortem. Two radiologists rated CT appearances using a standardised proforma, blinded to clinical, genetic and histopathological features. All participants had apolipoprotein E (APOE) genotyping. A neuropathologist rated brain tissue for CAA using a validated scale, masked to clinical, radiographic and genetic features. We defined a lobar ICH as CAA-associated if there was moderate/severe global CAA.

**Results:** Among 62 adults with lobar ICH (median age 83 years [IQR 78-86], 23 [37%] male), 36 (58%) were CAA-associated, and were independently associated with subarachnoid haemorrhage (32/36 [89%] versus 11/26 [42%];  $p=0.01$ ), ICH with finger-like projections (14/36 [39%] versus 0/26 [0%];  $p=0.04$ ) and APOE e4+ (18/36 [50%] versus 2/26 [8%];  $p=0.002$ ). Diagnostic criteria for CAA-associated lobar ICH using these variables showed excellent discrimination (c-statistic 0.92, 95%CI 0.86-0.98), confirmed by bootstrap internal validation. Rule-out criteria (neither subarachnoid haemorrhage nor APOE e4+) had 100% sensitivity (95%CI 88-100%). Rule-in criteria (subarachnoid haemorrhage and either APOE e4+ or finger-like projections) had 96% specificity (95%CI 78-100%).

**Conclusions:** Diagnostic criteria based on CT and APOE genotype show excellent discrimination for CAA-associated lobar ICH. These 'rule-in' and 'rule-out' criteria may inform therapeutic decisions that depend on identifying CAA-associated lobar ICH.

## **Appropriateness of MRI lumbar/sacral spine pathway for suspected cauda equina syndrome at the Royal Infirmary of Edinburgh**

**Presenting authors:** Dr J. Fitzpatrick, Royal Infirmary of Edinburgh

**Background:** Cauda equine syndrome (CES) is a serious condition, for which the gold standard for diagnosis is MRI.

**Methods** To assess the appropriateness of the pathway for suspected CES urgent MRI lumbar/sacral spine at the Royal Infirmary of Edinburgh (RIE), a retrospective audit was conducted of 50 consecutive scans requested by A&E and performed at RIE between 13/07/2016 and 09/11/2016.

**Results** 4 scans (8%) demonstrated cauda equine compression (CEC). Only 2 of these patients were considered to require urgent treatment after neurosurgical review. 29 scans (58%) were indicated according to RCR's M05 'iRefer' guideline. This did not meet the set standard of 100%. iRefer guideline was found to have a 100% sensitivity and 100% NPV, in this patient group, when used as a screening test for CEC on MRI.

**Conclusion** A small minority of patients were found to have CEC, and even fewer went on to have urgent treatment. The set standard of 100% of scans being appropriately indicated was not met. Use of RCR's iRefer guideline to triage was found to be appropriate with a 100% sensitivity and NPV for CEC on MRI. The current pathway can thus be said to be sub-optimal. Suggested changes include discussion of results with stakeholders, agreeing a set of local guidelines, a poster to publicise these guidelines, and changes to TRAK software request options.

## **Diagnostic Quality of CTPA's at the Borders General Hospital: A Full Cycle Audit**

**Presenting author:** Rachael Kirkbride. Royal Infirmary of Edinburgh

**Background:** Pulmonary embolism can cause significant morbidity and mortality and computed tomography pulmonary angiography (CTPA) is the investigation of choice when PE is suspected. The aim of this audit was to achieve good opacification (>200HU) of the main pulmonary trunk in >95% of CTPA scans carried out in the Borders General Hospital (BGH).

**Methods:** Data was collected for 50 consecutive patients receiving a CTPA scan in the first cycle and for 51 patients in the second cycle. After the first cycle a new protocol was implemented that all patients should receive an intravenous contrast flow rate of 5ml/s (increased from 4ml/s) through a green (18G) cannula in the antecubital fossa.

**Results:** The number of scans achieving >200HU opacification increased from 82% to 94% across the audit cycles. The radiologist's opinion on diagnostic quality of the scans also improved across the cycles from 64% to 80%, however there were a number of scans reports that did not comment on the scan's diagnostic quality (24% and 14% respectively), with one scan measuring a non-diagnostic level of opacification.

**Conclusions:** Increasing the flow rate of intravenous contrast to 5mls/s through an 18G cannula resulted in a higher number of scans of diagnostic quality. The audit also highlighted that there is scope to improve documentation of the diagnostic quality of the scans by radiologists in their reports to prevent falsely reassuring clinicians regarding the findings in those scans that are suboptimal.

## **Emergency Out of Hours Endovascular Hemorrhage Control Procedures: Evolution of Caseload, Casemix and Clinical Outcome between 2009 and 2014.**

**Presenting author:** Sook Cheng Chin. Ninewells Hospital Dundee.

**Background:** Analysis of changing caseload and casemix of out-of-hours (OOH) endovascular haemorrhage control (EVHC) procedures facilitates efficient service design, effective training and informed clinical decision-making.

**PURPOSE** Demand for emergency OOH EVHC procedures is increasing. The most dramatic and urgent cases are those in which IR undertake minimally invasive EVHCs where surgery is physiologically undesirable or technically challenging. We analysed the changing caseload, casemix and 30-day mortality for emergency OOH EVHC procedures performed in 2009 and 2014 with hopes to inform service design, training and clinical decision making

**METHOD AND MATERIALS** The setting was four centres providing OOH IR services for a population of 3 million. Data related to all OOH EVHC done in 2009 and 2014 were analysed, including mortality within 30 days of the index procedure. Procedures were categorised by site and aetiology of haemorrhage and by whether or not a therapeutic intervention was actually performed.

**RESULTS** Between 2009 and 2014: 1. The annual total caseload increased by 40% from 93 to 130 procedures ( $P < 0.05$ ), a per capita increase in caseload from 3.1 to 4.3 per 100,000 population 2. The number of therapeutic procedures increased by 34% from 84 to 113 3. Changes in casemix included significant increases in numbers of lower gastrointestinal (GI), non-surgical iatrogenic etiologies and spontaneous hemorrhage 4. The number of upper GI cases and postoperative bleeding was unchanged 5. The number of post-partum hemorrhage (PPH) cases was significantly reduced 6. 30-day mortality significantly increased from 9% to 18% ( $P < 0.05$ ) 7. Patients in the 2014 cohort were significantly older, mean age (range) 60.6 years (19-94) vs. 52.3 (19-91), ( $P < 0.05$ )

**CONCLUSION** Increasing demand for emergency OOH EVHC procedures was accompanied by increased caseload of lower GI, non-surgical iatrogenic and spontaneous hemorrhage, with fewer PPH cases. Speculation on reasons for changes creates interesting discussion points. The older patients in the 2014 cohort suggests that the observed increase in mortality rate is likely attributable to changing referral thresholds (e.g. more patients with co-morbidities and/or in greater physiological distress). Identifying these trends facilitates service design, effective training and clinical decision-making.

## **InterSeptal Distance – A quantitative indicator of Alzheimer’s Disease?**

**Presenting author:** Alim Yucel-Finn. Aberdeen Royal Infirmary

**Background** Alzheimer's disease is an age-related neurodegenerative disorder accounting for 50-75% of all dementia cases, and currently afflicts 520,000 people in the UK. Diagnosis of Alzheimer's dementia is difficult, with a suggested 78% of cases not diagnosed worldwide. Interseptal distance (ISD) is a novel brain imaging marker purported as a surrogate indicator for atrophy of portions of the limbic system; specifically the subcallosal area and paraterminal gyrus.

**Method** This work considers the well-characterised Aberdeen 1936 cohort. ISD was measured from serial MRIs. Data also available included occupation, educational attainment, and formal cognitive testing results. The relationship between ISD and these additional data variables were assessed using statistical methods.

**Results** 153 cohort members had serial MR imaging. ISD increases with age, significantly more in the male population. Too few cohort members had progressed to Alzheimer’s Disease for significant results. There are no significant correlations between ISD and educational attainment, and personal or parental occupation, at any age. ISD at age 68 does not demonstrate any significant correlation with cognitive ability or decline, but does for those scanned at age 73. There are significant correlations with at least three cognitive tests.

**Conclusion** This work has shown that ISD is a readily measurable imaging biomarker, with statistically significant correlations between increasing ISD and deteriorating cognitive test results. Of particular note, the correlation between ISD and the Rey Auditory Verbal Learning Test is very similar compared with the more established hippocampal volume.