Are We Sound at Ultrasound? A review of newly independent radiology registrars at inpatient ultrasound

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Aim

- To determine the quality of inpatient ultrasound imaging being performed by newly independent radiology registrars
- Newly independent: defined as having completed the 3 month US training block in ST1
- The 3 registrars involved in this study were in the first half of ST2 and individually they had 3, 6 or 9 months of independent experience prior to the study

Method

- All duty inpatient ultrasound scans performed by three ST2 trainees based in the University Hospital of Wales for a period of six months (August 2017 to January 2018) were included
- We reviewed all ultrasound scans with relevant follow up imaging performed within two weeks of the initial ultrasound examination
- PACS and RADS were utilised to look for data, reports and results

Results

- In total, 712 ultrasound scans were performed. Of these, 547 cases did not receive follow up within two weeks
- 165 cases proceeded to cross-sectional imaging
- In 133 of these cases, the further imaging agreed with initial ultrasound findings
- In 29 cases, there was a discrepancy with initial ultrasound findings
- In only 3 cases were the discrepancies considered significant (0.42%), these cases are awaiting discussion at the local discrepancy meeting

Discrepancies

- Most of the discrepancies between US and cross-sectional imaging were related to cholecdocholithiasis, primarily in the CBD. Other common discrepancies related to liver parenchymal abnormalities and renal units
- Other less common discrepancies included cholelithiasis, intra-abdominal haemorrhage, misreporting of renal pain location and misreporting of intraparenchymal duct or common bile duct size
- Discrepancies related to parenchymal liver abnormalities accounted for all of the three significant discrepancies, detailed in the cases to the right

Conclusion

- Overall, in house consultants believed junior trainee ultrasound was of a high standard, thorough and appropriate
- There was no significant difference in the performance of the three trainees
- Junior trainee ultrasound is a good diagnostic tool but has its limitations
- Identifying the significant misses in these cases is a useful learning opportunity for all ultrasound users

- We would appreciate input from other trainees and Deaneries, this would allow us to compare our practice and may identify areas of improvement.

Case 1

- Patient admitted with raised liver function tests (LFTs)
- Liver metastases were described on a previous MDT entry on PACS but were not mentioned on the patient request form
- Follow up CT 4 days later showed multiple metastases
- Whilst no patient harm occurred in this case, if these metastases were not visualised on a patient without known malignancy, this could have delayed treatment and had a significant impact on morbidity and mortality
- Liver lesions can be occult. Liver lesion characterisation remains difficult on US

Case 2

- A hypodense lesion was seen on CT in a patient with raised LFTs
- US was performed to characterise the lesion 2 days later, but the lesion was not visualised
- MRI performed 1 week later showed a 3 cm lesion in segment 5 with 3 further smaller lesions, diagnosed as liver abscesses
- Diagnoses of abscesses could have been made earlier if easily seen on US but patient treatment did not differ (patient was neutropenic and on appropriate IV antibiotics)

Case 3

- Raised LFTs in a patient with a history of metastatic colon cancer
- Challenging anatomy due to right hepatic artery and right portal venous branches
- US reported as normal aside from anatomical variation
- Follow up CT performed on the same day showed intraparenchymal duct dilatation and soft tissue in and around a biliary stent, in keeping with obstruction
- MR performed 3 days later confirmed soft tissue around the biliary stent in keeping with tumour recurrence and a new abscess in segment 4B
- The new biliary soft tissue lesion and intraparenchymal duct dilatation were not identified on the initial ultrasound

- The patient received a percutaneous transhepatic cholangiogram 1 day after MR (although obstruction was seen on CT 4 days before)
- Patient treatment is unlikely to have altered as the patient was not taken for biliary drainage after the obstruction was demonstrated on CT

Discrepancy # Characteristic US Findings Sensitivity of US

Cholecdocholithiasis

1. Echogenic rounded focus within the CBD. ~20% of common bile duct stones will not shadow. May have twinkling artefact.

Renal Calculi

1. Echogenic focus with acoustic shadowing, may have twinkling artefact or comet-tail artefact on colour Doppler.

Liver Lesions

4. Variable appearance based on aetiology. Abscesses were of particular importance in our study and these can range from hypodense (with some internal collision) to hypoechoic; Absent central perfusion. May have gas bubbles. May mimic hepatic tumours

Acute Pancreatitis

2. Increase in size and hypoechoogenicity due to oedema. Complications of pancreatitis, e.g. pseudocyst, often easier to see.

Pylephlebitis

2. Debris in the collecting system, reduced areas of cortical vascularity, abnormal echogenicity of the renal parenchyma. May have gas bubbles.

Gallbladder Sludge

2. Low amplitude homogeneous echoes, laying on the posterior wall. Moves slowly with changes in patient position. May mimic gallstones but should not shadow.

Other

8- 10% -


With thanks to Dr Craig Parry for his review and feedback regarding these cases