INTRODUCTION

Welcome to another edition of the READ eNewsletter and thank you to those who have contributed cases. We encourage all radiologists to contribute to patient safety through shared learning, by submitting events and discrepancies that have been discussed at local Learning from Discrepancies meetings (LDMs).

This newsletter raises some common themes from which we can all learn. The multiple interruptions, increased time pressure and busy environment in which we work can contribute to interpretation and satisfaction of search errors, by interfering with the systematic approach, including optimal windowing, that should ideally be taken when reviewing images.

READ on ...

The READ Review Panel
November 2014

A RARE INJURY WHICH IS FREQUENTLY MISSED

A 35-year-old male presented to the minor injuries unit following a fall. The patient had been carrying his young son in his right arm when he tripped and fell heavily onto his left shoulder.

An anteroposterior (AP) view (Figure 1) and attempted apical oblique view (Figure 2) of the left shoulder were performed. The humeral head was rotated on both views, however, there was the impression of a ‘joint space’ maintained between the humerus and glenoid. The interpreter failed to recognise the dislocation and the patient was discharged home. The patient re-presented the following day complaining of persistent pain, not controlled by a combination of co-codamol and non-steroidal anti-inflammatories. A left acromioclavicular joint view was obtained and correctly reported as normal. It is unknown whether the previous shoulder images were reviewed again.

The patient was referred for outpatient follow-up in the emergency department (ED) soft-tissue injury clinic, where he was reviewed four days after the initial injury, complaining of inability to sleep due to pain, limited abduction and tenderness.

The assessing physiotherapist was suspicious of a traumatic rotator cuff injury and referred the patient to the orthopaedic shoulder clinic.

The radiographs were reviewed in the ‘virtual’ orthopaedic clinic the following day and deemed inadequate as, essentially, only one view had been obtained. A posterior humeral dislocation was suspected. The patient was subsequently admitted for a computed tomography (CT) scan nine days after the initial presentation. CT confirmed that the humeral head was dislocated posteriorly and impacted on the posterior glenoid with a reverse Hill-Sachs lesion on the anteromedial humeral head (Figure 3), holding the head out of joint.

The patient had open reduction in theatre with elevation of the reverse Hill-Sachs supported with two ‘raft’ screws.

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REPORTER’S COMMENTS

Main causes

- Inadequate views (only one view) of the shoulder obtained at presentation, possibly due to patient discomfort.
- Interpreter falsely reassured by the appearance of a ‘joint space’ between the humerus and glenoid. The humerus also lies at the correct level craniocaudally in posterior dislocation. The clue to the diagnosis lies in the significant degree of rotation of the humeral head, which can only occur when there is associated dislocation, giving the classic ‘light bulb’ appearance.
- Failure to obtain an adequate second view or to adequately review previous imaging at subsequent attendances.

LESSONS LEARNED

If inadequate views have been obtained, consideration should be given to repeat attempts, alternative views or a different imaging modality, particularly in this setting, where the patient’s pain is disproportionately severe.

Posterior dislocation of the humerus should be considered where the humeral head appears significantly rotated, as this may be the only clue on the AP image.

FURTHER COMMENTS

Posterior shoulder dislocation is a rare injury and is commonly overlooked by both clinicians and radiologists. Posterior dislocation may be missed initially on frontal radiographs in 50% of cases. Absence of external rotation on a frontal shoulder radiograph should raise suspicion for posterior dislocation. There are several well-described signs (light bulb appearance, trough line sign etc) and familiarisation with these subtle indicators may reduce the risk of missing this diagnosis.1

As many of these patients will be in acute pain, it may be challenging to obtain optimal images, making the interpretation difficult. An alternative imaging modality such as CT may be considered after clinical discussion, enabling a definitive diagnosis to be made.

References


Further reading


The trough line sign

Figure 1. Axial CT image demonstrating the right breast ‘mass’ (yellow arrows)

Figure 2. Coronal CT image covering right breast ‘mass’ (yellow arrows)

LESSONS LEARNED

Radiologists in the department have benefitted from the educational value of discussing the case at the LDM. No change in practice was required, other than a reminder to the breast surgeons at the MDTM to provide more detailed clinical information to the radiologist.

FURTHER COMMENTS

This case illustrates how the cause of a discrepancy or error can often be multifactorial. The incomplete clinical information (a system cause) contributed to the radiologist identifying the abnormality but attributing it to a different cause. Effective communication has a direct effect on reporting. The final diagnosis has been shown to change in 50% of cases following communication between the clinician and radiologist.1 This has also been highlighted in a previous READ eNewsletter.2 Not only is it appropriate to mention when the surgery has taken place, we should also remind clinical colleagues that the type of surgery is relevant to reports. Different types of surgery can have characteristic appearances on imaging.3 This case did not result in harm to the patient. It also illustrates the importance of peer review, particularly at the MDTM, when the review is undertaken by a specialist radiologist who is in a position to bring the case back to the LDM for shared learning.

References


REPORTER’S COMMENTS

Main causes

- Inadequate clinical information.
- The radiologist was unaware of the different surgical pathway for breast cancer (that is often operated on before any CT staging) compared to other cancers.
- The radiologist was unaware of the potential appearance of a postoperative breast soon after reconstruction.

EFFECTIVE COMMUNICATION IS THE KEY TO CORRECT DIAGNOSIS

A 52-year-old female patient was referred for an urgent outpatient CT thorax, abdomen and pelvis with the clinical information, ‘Right breast cancer staging please’. The CT scan was performed and reported as showing a relatively large and diffuse tumour within the right breast (Figures 1 and 2). No regional lymphadenopathy or distant metastatic disease was observed. The case was discussed at the breast cancer multidisciplinary team meeting (MDTM), where it transpired that the CT scan had been performed postoperatively following right breast reconstruction, which accounted for the abnormal density in the upper outer right breast. This case was discussed at the departmental LDM. No harm was caused to the patient.
A 37-year-old lady was admitted with palpitations, central chest pain, dizziness and shortness of breath. Clinically, pulmonary embolus (PE) was suspected and a ventilation-perfusion (V/Q) scan was undertaken, which was normal. Due to persisting symptoms, a CT pulmonary angiography (CTPA) was performed to exclude a PE.

The CTPA was reported as demonstrating a PE in the right main pulmonary artery (Figure 1). The patient was treated with rivaroxaban and discharged home. A week later, the spinal multidisciplinary team (MDT) contacted the radiology department as this patient was under consideration for further surgery.

At subsequent review of the original CTPA, the appearance of the right pulmonary artery was found to be an artifact from the spinal pedicular screws (from previous spine surgery) which had been misinterpreted as a PE.

The referring team and the patient’s general practitioner (GP) were contacted and her treatment was stopped. The patient had not suffered any side-effects due to the treatment.

This case was submitted for discussion in the local LDM as well as at the clinical morbidity and mortality meeting.

REPORTER’S COMMENTS

Main causes

- Satisfaction of search – symptoms with cause explained.
- Artefact may have been picked up by further review with bone windows.
- Outside factors, such as a busy list, disturbance from other clinicians and so on.

LESSONS LEARNED

- Take more time in reviewing images in a quiet environment.
- Use bony windows and multiplanar reconstruction (MPR) as part of systematic review.
- V/Q single photon emission tomography (V/Q SPECT) has a very high negative predictive value in the diagnosis of PE, hence there is a low degree of suspicion on CTPA.
- Good immediate communication with referring clinicians is necessary after discovering a discrepancy, to ensure patient care is not affected.

FURTHER COMMENTS

Errors can arise due to satisfaction of search, when the radiologist’s attention focuses on an abnormality which satisfies the search for meaning. This can lead to ‘missing’ a second abnormality or, as in this case, an incorrect interpretation of the abnormality, which correlates with the clinical information. This may well result in the termination of search. Perceptual errors in radiology are related to psychophysiological factors, including level of observer alertness, observer fatigue, duration of the observation task and distracting factors such as the clinical information provided, interruptions and multitasking. These distracting factors are particularly prevalent in departments where demand is rising, along with expectations of a fast turnaround time.

Protected reporting time and highlighting such errors through peer review every time they are encountered reminds us of the importance of interrogating images in a systematic way, using different windows, and promotes a safety culture within radiology departments.

Further reading


OPTIMAL WINDOWING CAN LEAD TO CORRECT DIAGNOSIS

In June 2010 an 82-year-old female patient was referred by the haematology department for a CT head for acute diplopia on upward gaze, the patient had a background of previous lymphoma and breast cancer. The clinical suspicion was of metastatic disease. Pre- and post-contrast CT brain was reported as showing small vessel disease only. The patient was referred again by haematology for CT brain in May 2014, this time for documented sixth nerve palsy (side not stated). This was reported as showing age-related atrophy and chronic ischaemia. Further review of these images was sought in July 2014, when an avidly and homogenously enhancing lesion was noted in the left cavernous sinus. This had enlarged from 17 mm diameter to 23 mm diameter over four years. Subsequent magnetic resonance imaging (MRI) has proven this to be an internal carotid artery (ICA) aneurysm which is not amenable to treatment. Figures 1–3 show the patient imaging that was available.

REPORTER’S COMMENTS

Main causes
- Side of ophthalmoplegia not specified on request form.
- Likely sites of disease not adequately scrutinised on CT.
- Windows not altered on post-contrast scans to demonstrate aneurysm.

LESSONS LEARNED

The case has been discussed at the local LDM, including the various radiologists who were involved. The importance of scrutinising the cavernous sinuses and changing windows on the post-contrast scan were discussed, particularly in cases of ophthalmoplegia. Ophthalmoplegia with a normal CT should usually prompt MRI.

FURTHER COMMENTS

This case is very similar to the previous case and reiterates that errors can arise as a result of satisfaction of search. It demonstrates the need for a systematic approach to reviewing scans and use of optimal windows to avoid missing a pathology. In all examinations, there are certain ‘review areas’ – which may differ for each of us – where the pathology may not be obvious, but can be identified if reviewed in detail.

Due to the mismatch between the ever-growing demand on finite resources, a systematic approach is especially useful in the increasingly stressful environment in which all of us work.

Optimal windowing can lead to correct diagnosis

Figure 1. Relevant unenhanced CT brain image from June 2010
Figure 2. Relevant enhanced CT brain image from June 2010
Figure 3. Relevant enhanced CT brain image from June 2010 windowed to show ICA aneurysm (yellow arrow)

Continue READing

Shared learning is just what it says it is. READ is here to encourage this but remember this has to be driven by radiologists for radiologists. We suggest that each case discussed at your local Learning from Discrepancies meeting is considered for submission to READ. We are aware of several departments that now have a ‘Suitable for READ?’ ‘Yes/No’ section on their discrepancy submission forms.

We are also keen to hear your feedback on the cases you have read in READ; please email read@rcr.ac.uk to let us know your comments.

READ Review Panel:
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Professor Clive Kay – Medical Member
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Dr Ram Chittal – Junior Member
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