BESS Working Group

Point of Access Shoulder Ultrasound by Shoulder Surgeons

Recommendations to BESS Council

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Summary

A BESS working group met and ran an Ultrasound Workshop on Friday 15 April 2011 at the Botnar Research Centre in Oxford. The meeting was led by Jonathan Rees. The aim of the day was to propose British Elbow and Shoulder Society guidelines on the use of shoulder ultrasound by BESS members for point of access care for patients.

The day was structured with up to date presentations that included the musculoskeletal radiology guidelines (UK and European) on the use of musculoskeletal ultrasound and an examination of any evidence base behind these guidelines. A thorough literature review on the use of ultrasound examination of the shoulder both by radiologists and non-radiologists was also presented and discussed. The Oxford Group then presented the results of an accelerated learning method for shoulder ultrasound specifically designed for shoulder surgeons wishing to use this modality to assess the rotator cuff. The second half of the day was spent developing recommendations and a framework for BESS members wishing to undertake shoulder USS. These recommendations were based on the radiology and surgical evidence available regards both radiology and surgeon performed shoulder USS. The meeting concluded with the aim of preparing written guidelines that could be submitted to BESS Council for the June 2011 meeting.

All members of the working group have read and approved this report.

Recommendations

This report to BESS council is based on current radiology and surgical evidence and the proposed recommendations for surgical USS training focuses on the unique position shoulder surgeons find themselves, in being able to correlate USS findings to actual arthroscopic findings. This report is presented under 3 sections:

Section 1: Evidence Based Guidelines
Section 2: Training and Competency Pathway
Section 3: Audit and Governance

1 Evidence Based Guidelines

Ultrasound is a very low risk imaging modality that has a wide range of uses in musculoskeletal assessment. Point of access shoulder USS, as an extension of a surgeon's history taking and clinical examination, allows for the provision of one stop clinics with efficient delivery of best care to patients with shoulder pain. The clinically relevant structures of the shoulder that can be assessed by USS and that have an actual impact on decision-making in shoulder management are the rotator cuff and long head of biceps (LHB). These guidelines are therefore specifically aimed at Post CCT Shoulder Surgeons wishing to learn shoulder USS to image the rotator cuff and LHB as an extension of their clinical examination.

The current literature supports the use of shoulder USS to image the rotator cuff having demonstrated it to be as accurate as MRI and as reliable at detecting full thickness tears when compared to arthroscopic findings. Although hospital radiology reporting of shoulder USS continues to include diagnosis of partial thickness rotator cuff tears, LHB pathology, bursal thickening and bursal fluid, the published literature, interestingly, does not demonstrate reliable evidence to support the use of USS in reliably identifying these pathologies. Furthermore although it is common practice for sonologists to measure and report the size and retraction of full thickness tears, review of the radiology literature has failed to prove the accurate reliability of such estimates.

With regard to training, the opinion of the European Federation of Societies for Ultrasound in Medicine and Biology (2008), and the UK Royal College of Radiologists (2005) is that learning musculoskeletal USS requires 250 to 300 hundred scans. These guidelines are based on expert opinion and there have been no peer review publications to date that have looked at rates of learning and competency. Furthermore these recommendations are for musculoskeletal USS in general as opposed to guidelines for shoulder surgeons wishing to learn shoulder USS to image only the rotator cuff and LHB. However, once competent the literature does support the use of ultrasound by non-radiologists, including Shoulder Surgeons, to identify full thickness tears of the rotator cuff (using portable machines) and with a high level of accuracy with results comparable to radiologists (usually using larger machines). One UK shoulder unit has recently specifically looked at the issue of learning shoulder USS with the clinically useful aim of identifying full thickness tears of the rotator cuff. As is now common in the surgical specialties, it is not about the number of surgical procedures that trainees perform, but about competency and the quality of teaching

opportunities. We recommend this approach to surgeons wishing to learn shoulder USS to image the rotator cuff. The study from Oxford took surgeons without any previous experience of shoulder ultrasound and monitored their ability to learn to evaluate rotator cuff integrity using ultrasound compared to arthroscopic findings. The surgeons scanned patients with subacromial shoulder pain preoperatively on the same day they were admitted for shoulder arthroscopy. This allowed the surgeons to receive same day feedback with comparison of arthroscopic images of the rotator cuff to the ultrasound images and provided an accelerated learning experience. This method of learning shoulder USS, unique to shoulder surgeons, allowed the surgeons in this study to reach sensitivities, specificities and predictive values for detecting full thickness tears of the rotator cuff that were comparable within 50 to 100 scans with many radiology publications. By 100 scans, these 'novice' results (Sensitivity = 91%, Specificity = 97%, Positive predictive value = 95%, Negative predictive value = 94%) were similar to the very best published results by 'experienced' musculoskeletal radiologists. (Sensitivity = 100%, Specificity = 91%, Positive predictive value = 96%, Negative predictive value = 100%).

BESS therefore recommends the following method of training for those surgeons wishing to learn and perform shoulder USS of the rotator cuff:

a) Attend an USS training course to learn the physics, safety issues, as well as machine and probe manipulation.

b) Adopt the learning and competency protocol in section 2 of these guidelines, keeping a log book and being able to calculate sensitivity, specificity, positive and negative predictive values. Appendix 1 and 2 include PDF assessment sheets for log book use.

c) Once competent, surgeons should consider undertaking periods of self governance and audit as highlighted in sections 2 and 3

Key references:

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8. Ziegler DW. *The use of in-office orthopaedist-performed ultrasound of the shoulder to evaluate and manage rotator cuff disorders*. J Shoulder Elbow Surg. 2004;13(3):291-297.
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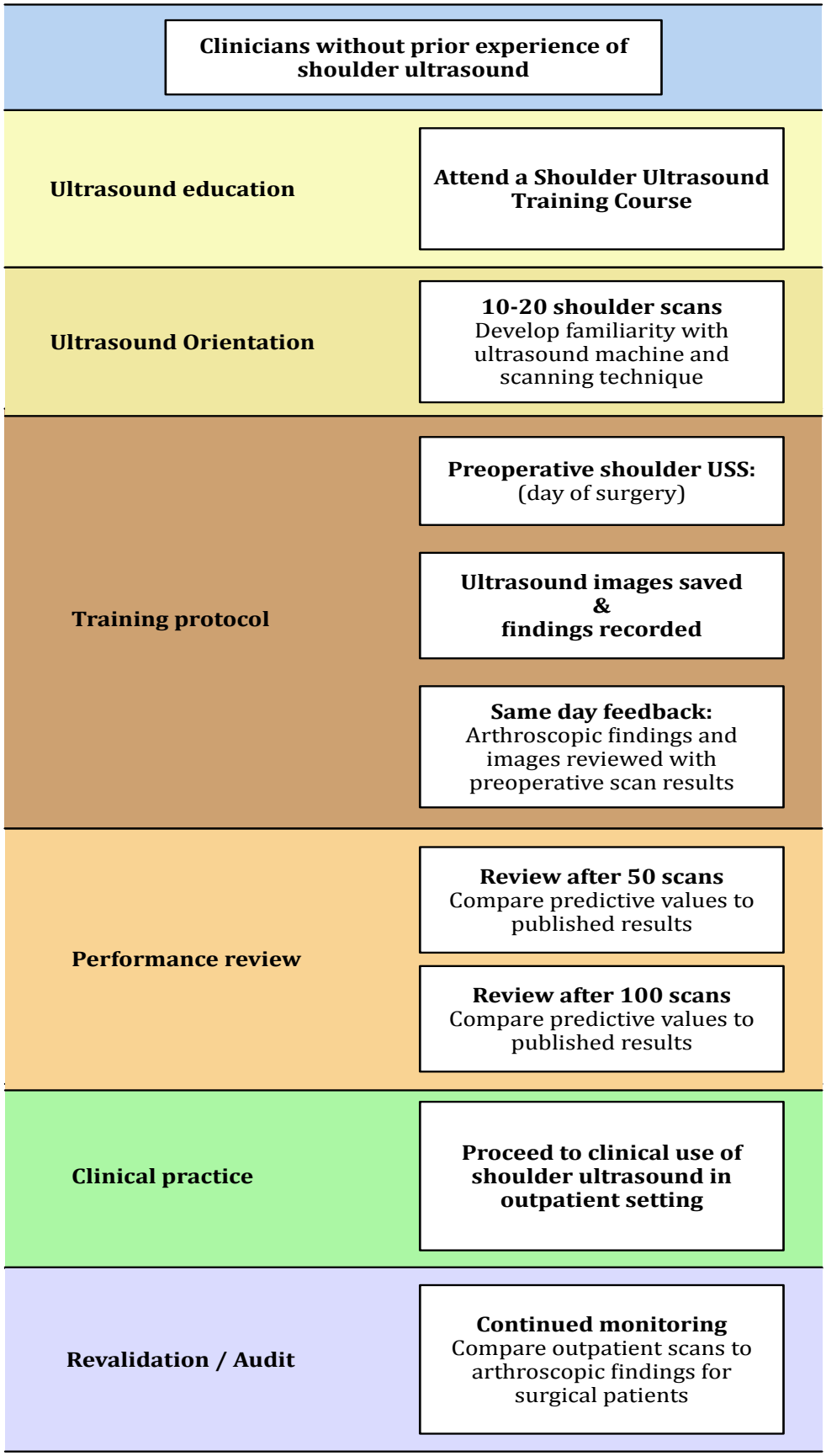
2 Training and Competency Pathway

We recommend reading the article by Murphy et al (9), which details how to maximise the learning and validity of the pathway shown below. For surgeons, planning to learn shoulder USS begins well before the day of scanning and surgery. Surgeons need to attend an USS course to learn about physics, safety and probe manipulation. They should also consider booking their patients with subacromial impingement pain (that require surgery) as needing 'arthroscopic subacromial decompression +/- rotator cuff repair'. This ensures a mixture of rotator cuff pathology in the patients scanned, minimises bias and allows the surgeon to scan these patients on the same day they are admitted for surgery subsequently reinforcing the training and learning experience by comparison to same day actual arthroscopic findings (of patients with and without rotator cuff tears).

Training and Competency Pathway



3 Audit and Governance

The principles of the pathway used in section 2 for accelerated learning, training and self assessed competency also provides the perfect vehicle for self audit and governance. BESS is not in a position to ratify or audit surgeons' ultrasonographic competencies: the opportunities afforded by the accelerated learning pathway (section 2) include provision for surgeons to develop their own personal audit and self regulation programme. Although many surgeons will feel that with increasing experience their USS results and predictive values will only further improve it will become increasingly important in the modern NHS to demonstrate this. BESS would suggest that an audit every two to three years is a sensible way to practice (although there is no requirement for radiologists to do this). It allows the surgeon to produce his/her sensitivity, specificity and predictive values for full thickness rotator cuff tears based on the easily accessible arthroscopic gold standard assessment. If surgeons are in possession of such results then performance and ability is not really open to debate or challenge. Those however not in possession of these performance indicators may quite rightly be open to challenge.

Appendix A USS Data Collection Sheet

Date _____ **Study No.** ☐☐☐☐

		LEFT		RIGHT	
Biceps Tendon	**Present (in groove)**	☐ N	☐ Y	☐ N	☐ Y
	Stable	☐ N	☐ Y	☐ N	☐ Y
Subscapularis tear		☐ N	☐ Y	☐ N	☐ Y
Tendon Quality:		_____		_____	
Supra/infraspinatus tear		☐ N	☐ Y	☐ N	☐ Y
Tendon Quality:		_____		_____	
Rotator Cuff tear size: (anterior to posterior dimension)		_____		_____	

Tendon quality: 1=normal tendon, 2=abnormal tendon, 3=abnormal tendon: partial thickness tear

Notes:

Appendix B ARTHROSCOPY Data Collection Sheet

Date _____ **Study No.** ☐☐☐☐

		LEFT		RIGHT	
Biceps Tendon	**Present (in GH joint)**	☐ N	☐ Y	☐ N	☐ Y
	Subluxed	☐ N	☐ Y	☐ N	☐ Y
Subscapularis tear		☐ N	☐ Y	☐ N	☐ Y
Tendon Quality:		_____		_____	
Supras/infrapinatus tear		☐ N	☐ Y	☐ N	☐ Y
Tendon Quality:		_____		_____	
Rotator Cuff tear size: (anterior to posterior dimension)		_____		_____	

Tendon quality: 1=normal tendon, 2=abnormal tendon, 3=abnormal tendon: partial thickness tear

Notes: