Rotator cuff imaging and the Accident Compensation Corporation (ACC)

Michael Caughey

This issue of the *Journal* contains an article entitled *Can imaging determine if a rotator cuff tear is traumatic?* by Khalid Mohammed and colleagues. The authors are to be congratulated on what is a comprehensive review of imaging of the rotator cuff largely as it relates to rotator cuff tears.

What has stimulated interest in this topic? According to Accident ACC Minister Nick Smith, between 2004 and 2008 there was a 57% increase in ACC claim costs which was deemed unsustainable.

Largely through more critical review of applications for surgery by the clinical advisory panel of the Elective Surgical Unit in Dunedin, a significant reduction in ACC-funded operations occurred. Between January and June 2008, 18,294 operations were undertaken compared to 20,679 in the same period this year. This represents a reduction of 2385 operations or minus 11%. Initially shoulder surgery and in particular repairs of the rotator cuff were especially affected by the high decline rate.

The incidence of rotator cuff tears increases progressively with age and a recent meta-analysis of patient prevalence of atraumatic asymptomatic rotator cuff tears indicated that 10% of the population at the age of 55 has a full thickness rotator cuff tear which increases to 30% by the age of 75. Thus when particularly an older patient presents with a full thickness rotator cuff tear following an accident determining if the tear is truly traumatic or a pre-existing condition rendered symptomatic by the accident (as the clinic advisory panel frequently asserts) may be problematic.

Clearly the patient history is critical with the mechanism of injury and a force sufficient to tear the rotator cuff being key elements. The force required to damage the rotator cuff in an 80-year-old is significantly less than that of a 40-year-old in the same way that the force required to fracture a femoral neck is considerably less. Any acute loss of function is clearly an important feature of the history. Specific strength testing for the components of the rotator cuff at initial presentation is critical particularly for acute tears.

What percentage of rotator cuff tears requiring surgery are traumatic in onset? Probably the best local information comes from The Rotator Cuff Registry. This study is an initiative of the New Zealand Shoulder and Elbow Society and since March 2009 its goal has been to recruit all patients in the country undergoing rotator cuff repair. To date, 3000 patients have been enlisted making it easily the largest study of its kind worldwide. Pain and activity level questionnaires are filled out by patients preoperatively and at 6, 12 and 24 months postoperatively.

The surgeon fills out a 2-page operating day questionnaire detailing exactly what was done and this looks as if it will provide powerful information on best practice in managing cuff tears—e.g. double vs single row repair, arthroscopic vs mini-open vs
open repair, management of SLAP tears, the biceps tendon and the AC joint as well as the influence of NSAIDs, smoking, and physiotherapy on the surgical outcome. In the “Event details” pre-op form patients are asked “Is your shoulder problem the result of an accident?” In a recent analysis of the data 90% of patients replied “Yes”.

The accuracy of the history of injury as detailed by the patient has been called into question. In discussions between the NZ Shoulder and Elbow Society and ACC Representatives the latter group has indicated that in some cases they observe the patient’s history of injury evolving in magnitude with time. Hence the pursuit of potentially objective information that imaging may provide.

Heavy reliance has been placed on such information by the Clinical Advisory Panel in coming to decisions regarding patients’ eligibility for ACC-funded elective surgery. Often this has outweighed the evidence of a strong history of injury and obvious clinical findings of a rotator cuff tear. Thus the significance of acromial shape, upward migration of the humeral head, cystic change in the greater tuberosity, degree of tendon retraction, and the degree of atrophy and fatty infiltration of the parent muscle have been closely scrutinised in both the aetiology and likely chronicity of rotator cuff tears.

There are two areas of ongoing discussion and debate I would like to focus on in this editorial. First, how relevant is acromial morphology? Second, I stress the difficulty of differentiating between primary and secondary impingement.

Probably the most quoted study on the relevance of acromial shape is that presented in 1986 by Bigliani and Morrison. In the 140 cadaveric shoulders dissected type 1 or flat acromia were associated with a 3% rate of cuff tears, type 2 or curved acromia with a 24% rate of cuff tears and type 3, or hooked acromia with a 73% rate of cuff tears. While an apparently convincing correlation subsequent studies, notably one by Gill and associates showed no significant association between type 3 acromia and rotator cuff tears in patients over 50 when age adjusted.

They suggested both the presence of type 3 acromia and rotator cuff tears were age-related with no true causal relationship. Mohammed et al also allude to the papers By Stehle et al and Bright et al questioning the reliability and reproducibility of radiological assessment of the acromion. Being a three dimensional structure assessment in more than one plane is important.

With regard to partial thickness tears Mohammed et al note “numerous reports of articular surface tears being two to three times more common than bursal surface tears” which is not what would be expected if primary impingement was the mechanism. Bursal side partial thickness tears are more likely to occur with subacromial impingement.

Impingement has been very commonly cited as a cause to decline applications for ACC funding for rotator cuff repair. However once a patient has sustained a rotator cuff tear, the glenohumeral kinematics are altered. A dynamic balance exists between the powerful deltoid driving the humeral head proximally and the supraspinatus countering this force. If weakened through tearing of the tendon, the head migrates upward.
Ken Yamaguchi at Washington University has demonstrated that once tears increase to a size larger than 1.5 cm measurable superior humeral head migration occurs. It is very likely that smaller tears will have a subtle if not measurable effect.

Following partial thickness articular-sided tears where joint fluid bathes the torn tendon and healing rarely occurs bursal hypertrophy may provide continuity between the tendon and the humerus beyond the supraspinatus footprint. This thickened bursa frequently evident on ultrasound coupled with subtle upward migration of the humeral head may result in impingement not previously present, particularly if the subacromial space is limited.

Hence secondary impingement occurs as a direct result of the tear and this should not be interpreted as a primary impingement problem resulting in entitlement to surgery being declined.

**Competing interests:** None.

**Author information:** Michael Caughey, Orthopaedic Surgeon and President of the New Zealand Shoulder and Elbow Society, Auckland

**Correspondence:** Mr Michael Caughey, 92 Mountain Road, Epsom, Auckland, New Zealand. Email: mcaugheyltd@xtra.co.nz

**References:**