QUESTION | How should we be treating neck of humerus fractures in older patients? There seems to be a trend towards operating less and treating more of them in a sling.

ANSWER | Fractures of the proximal humerus are the third most common fracture in patients over 65 years. In general, only about 20% are treated surgically however there is no clear consensus on who will benefit most from surgery. Current treatment options include an open reduction and internal fixation with a locked plate and screws, a hemiarthroplasty where the humeral head only is replaced, or a reverse total shoulder replacement.

Assessment: Proximal humeral fractures usually occur from low energy trauma such as a fall from a standing height. The incidence is increased in osteoporosis and may be an indication to initiate osteoporosis treatment. Associated problems can include a shoulder dislocation or an axillary nerve palsy with loss of deltoid function.

Standard AP and lateral radiographs are mandatory. If there is significant displacement of the fracture or if any surgery is considered than a CT with 3D reconstructions is also needed.

Anatomically the glenoid acts as an anvil that impacts and displaces the humeral head. The tuberosities displace depending on the relative pull of the attached rotator cuff muscles. The greater tuberosity tends to displace superiorly and posteriorly due to the pull of supraspinatus and infraspinatus, and subscapularis displaces the lesser tuberosity medially if it is a separate fragment.

This is the basis for Neer's classification of proximal humerus fractures. A 2-part fracture involves a fracture through the surgical neck or greater tuberosity only, whereas 3- and 4-part fractures can have separate articular, greater and lesser tuberosity fragments.

Management: The majority of fractures can be treated non-operatively. A shoulder immobilizer is worn to support the humeral head and avoid the rotator cuff displacing the fracture fragments further. Range of motion exercises are introduced as union progresses. Early passive range of motion within 2 weeks of injury leads to better outcomes than prolonged immobilization. The sling is removed once clinical union has occurred, usually at about 6 weeks. Concerns with non-operative management include non-union, avascular necrosis and malunions leading to motion loss or impingement.

For more displaced fractures surgery may be indicated. Open reduction and internal fixation is usually reserved for younger patients with better quality bone. Although it is desirable to preserve a patient's bone, concerns with inadequate fixation in osteoporotic bone, and screw cut-out remain.

Reverse total shoulder arthroplasty is becoming an increasingly popular option for significantly displaced fractures. Originally designed for rotator cuff arthropathy, it consists of a rounded glenosphere on the glenoid side, and a humeral cup and stem on the humerus. It

only requires a working deltoid muscle to function and therefore does not rely on any tuberosity healing for a successful outcome. Active motion can be started much earlier and independence regained sooner. Concerns include the risk of major surgery as well as late concerns with dislocation, infection, loosening and deltoid weakness.

Overall the choice of treatment is very dependent on both the fracture configuration as well as each patient's specific demands. For simple fractures non-operative treatment has reliable and reproducible results. For more complex fractures the choice is less clear. In general, in osteoporotic bone ORIF and hemiarthroplasty have not been clearly shown to improve outcomes over non-operative management. Early results of reverse shoulder arthroplasty are favourable especially when compared to other surgical methods. Currently a multicentre randomised controlled trial is being conducted across Sydney comparing the outcomes of non-operative management to reverse shoulder arthroplasty for displaced 3- and 4-part fractures. A detailed discussion with an orthopaedic surgeon will help tailor management to each patient's needs.

3-part proximal humeral fracture

Reverse Total Shoulder Replacement. A sphere is placed on the glenoid and the humeral head is converted to a cup.

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