Clinical summary

The reverse shoulder arthroplasty angle:
a new measurement of glenoid inclination for reverse shoulder arthroplasty

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In Reverse Total Shoulder Arthroplasty (RSA), determining the optimal glenoid baseplate positioning is important for the potential to reduce glenoid loosening, scapular notching, prosthetic instability and decreased mobility. The authors of this study have proposed a new way to measure inclination for the inferior portion of the glenoid fossa where a reverse arthroplasty baseplate would be positioned to potentially avoid superior tilting of the glenoid component. This new method of measurement is called the Reverse Shoulder Arthroplasty Angle (RSA Angle).

To better understand the proposed anatomical RSA angle, the Total Shoulder Angle (TSA angle) was determined in conjunction with the RSA angle. The TSA angle utilizes the line between the inferior and superior points of the glenoid fossa and the intersecting line from the floor of the supraspinatus fossa subtracted from a perpendicular line originating at the inferior point of the glenoid fossa to the floor of the supraspinatus fossa line. The RSA angle utilizes the line extending from the floor of the supraspinatus fossa, a perpendicular line to the inferior point of the glenoid fossa and a line extending from the inferior glenoid fossa point to the intersecting point of the supraspinatus fossa line on the glenoid face. The difference between the inferior supraspinatus fossa perpendicular line to the inferior point of the glenoid face and the line originating at the face of the glenoid at the inferior supraspinatus fossa line to the inferior point of the glenoid, is called the RSA angle.

This retrospective, radiographic and preoperative planning software review included 47 patients with a diagnosis of rotator cuff tear arthropathy. Measurements were conducted on plain 2D radiographs and 3D software utilizing computed tomography (CT) scans.

Key takeaways

- Although the optimal method to correct superior inclination of the glenoid component in RSA is debatable, it is important to attempt to place the baseplate in a neutral position and to avoid any superior tilting of the baseplate allowing for the remaining cuff muscles to be potentially more efficient and to potentially reduce complications including component loosening, scapular notching and decreased mobility.

- Using 2D radiographs or 3D reconstruction software (Glenosys), the average RSA angle was measured to be 21° +/- 5°. This would indicate that when planning to perform an RSA procedure in a patient with Cuff Tear Arthropathy (CTA), those between 15° and 25° of superior inclination would need inferior correction to achieve neutral inclination of the baseplate and sphere.

(continued)

Key takeaways (continued)

- Reaming inferiorly for optimal neutral baseplate seating could lead to excessive medialization of the glenoid component and may compromise bone stock leading to prosthetic instability, scapular notching, glenoid loosening, and decreased mobility. As such, the authors suggest the need for component augmentation, including either a superior augmented baseplate or an inferiorly inclined bone graft.

- The Favard type with the greatest potential risk for superior baseplate tilt is the E1 type with concentric erosion in which the RSA angle measures around 20° to 25° degrees and the risk of baseplate implantation with a superior tilt is underestimated when using a TSA angle.

- Preoperative planning is essential for proper assessment of glenoid erosion and placement of the reverse baseplate tilt. Using the RSA angle, the surgeon can approximate the needed correction to place the baseplate into a neutral position and to avoid the superior tilt of the glenoid component.

- In conclusion, the authors confirmed their hypothesis that the RSA angle provides a reliable and reproducible measure of the inclination of the inferior portion of the native glenoid where a baseplate would be placed to potentially reduce complications.

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