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Making Your Tomorrow Healthier

REVERSE SHOULDER ARTHROPLASTY

MODERN SOLUTION FOR SHOULDER PAIN

Dr. P.S JAYAPRASAD

MBBS, MS ORTHOPEDICS (NIIMS)
HEAD OF ARTHROSCOPY, ROBOTIC ARTHROPLASTY,
SPORTS AND REGENERATIVE MEDICINE
DEPARTMENT OF ORTHOPEDICS

REVERSE SHOULDER ARTHROPLASTY

INTRODUCTION

Prior to the introduction of the reverse total shoulder arthroplasty (rTSA), Patients with cuff tear arthroplasty (CTA) were treated with anatomic total shoulder arthroplasty (TSA). However, in patients with rotator cuff deficiency, the humeral head migrated superiorly, subjecting the glenoid implant to shearing forces, resulting in a “rocking horse” phenomenon leading to glenoid loosening.

To compensate for the rotator cuff deficiency, the ball and socket articulations were reversed.

In 1987, Professor Paul Grammont presented a new concept of reversed total shoulder arthroplasty. His revolutionary design was based on 4 key Principles:

- Intrinsic prosthetic stability.
- Concavity of the supporting part and convexity of the weight bearing part (glenoid).
- Glenosphere centre at or within the glenoid neck.
- Medialised and distalised centre of rotation.

A reverse shoulder replacement is a modern reconstructive shoulder surgery that replaces the damaged ball-and-socket joint with artificial components, but reverses their normal position. The ball component is attached to the shoulder blade (scapula), and the socket is attached to the upper arm bone (humerus).

PATIENT PRESENTATION:

Reverse shoulder replacement is done in patients who present to orthopaedics OPD with complaints of severe shoulder pain, poor active motion, near-normal passive motion, crepitus,

weakness, difficulty in performing daily basic activities and occasionally significant fluid buildup under the deltoid.

Indications for Reverse Shoulder Replacement:

- Glenohumeral arthritis of shoulder
- Rotator cuff tear arthroplasty is a degenerative shoulder disease caused by a massive rotator cuff tear causing arthritic glenohumeral joint and proximal humerus migration (Hamada Classification - Grade 4 & Grade 5)
- Revision surgery for failed anatomical total shoulder arthroplasty
- Inflammatory joint conditions, example rheumatoid arthritis
- Revision surgery for failed proximal humerus Hemiarthroplasty

CONTRAINDICATIONS:

RSA may not be suitable if:

- The deltoid muscle is weak or damaged
- There is active infection
- Very poor bone quality that cannot support the implant

How Does It Work? – The Biomechanical Advantage

- The center of rotation is moved medially and inferiorly, improving stability.
- The deltoid moment arm increases, enhancing forward flexion and abduction.
- The semi-constrained design restores function even in absence of functional cuff tendons.

COMPONENTS OF RSA:

Glenoid Components:

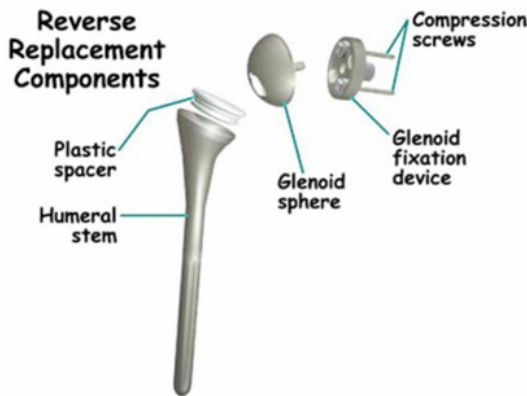
Glenoid Baseplate: A metal plate that is attached to the glenoid fossa (shoulder socket) of the scapula, usually with screws.

Glenosphere: A metal ball or hemisphere that attaches to the baseplate on the scapula.

Humeral components:

Humeral stem: A metal stem that is inserted into the humerus (upper arm bone), either with or without cement.

Polyethylene Humeral Cup: A plastic cup that fits onto the humeral stem and articulates with the glenosphere.



Reverse Replacement Components

Compression screws

Plastic spacer

Humeral stem

Glenoid sphere

Glenoid fixation device

PRE OPERATIVE ASSESSMENT

Imaging modalities

1) Shoulder X-rays:

Anteroposterior, Y-scapular, and axillary views are usually obtained before RSA. X-rays are useful for preparative templating, identifying bony lesions, and assessing bone quality.

2) Computed Tomography (CT) Scan:

CT scan is beneficial in assessing the humerus and glenoid bony stock and glenoid version for preoperative planning. A preoperative 3-dimensional (3D) CT scan can determine the proximal humeral retroversion.

3) Magnetic Resonance Imaging (MRI) Scan:

MRI could be used to assess the integrity of the rotator cuff before the surgery.

SURGICAL PROCEDURE AND RECOVERY

The surgery, which usually takes one to two hours, is performed under general or regional anaesthesia.

Steps

1. Surgical Approach-Deltopectoral Approach
2. Exposure of Humerus
3. Humeral Preparation
4. Glenoid Exposure
5. Glenoid Baseplate Placement

6. Glenosphere attachment

7. Humeral Component Insertion

Recovery

Recovery typically involves wearing a sling for 4-6 weeks, followed by a physical therapy program. Full recovery can take around six months. Patients typically achieve excellent pain relief and significant improvement in forward elevation (120-150°).

Benefits:

- RSA consistently demonstrates:
- High patient satisfaction
- Reliable pain relief
- Improved shoulder elevation and daily function
- Effective solution for previously “unsalvageable” rotator cuff-deficient shoulders and glenohumeral arthritis

COMPLICATIONS

Scapular notching

Glenoid loosening

Neurologic injury

Disassociation /Dissociation

CASE REPORT

A 77 year old female patient came to Orthopaedics OPD with complaints of pain and inability to lift bilateral shoulder (left>right) and difficulty to do daily activities since 1 year. Patient was apparently asymptomatic 1 year back and then developed pain in right shoulder which was sudden in onset and progressive, dull aching type and aggravated on movements and not relieved on taking rest and medications. Patient now came here for further management. No known comorbidities.

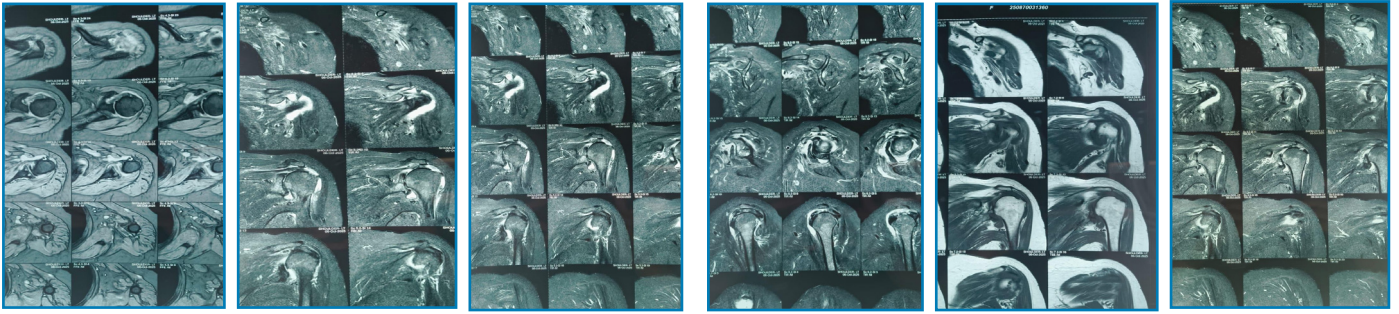
Patient was examined by an Orthopedic surgeon and necessary radiological investigations were done.

The findings of MRI reports were -

Impression:

- Acromioclavicular joint capsular thickening.
- Thinning of fibres of supraspinatus tendon with tendon retraction of~ 3 cm
- Complete tear.
- Severe volume loss of supraspinatus muscle belly.
- Free fluid in subacromial / subdeltoid region, axillary recess, superior subscapular recess, subcoracoid region and bicipital groove.
- Degenerative changes noted in form of humeral head osteophyte, few sm subchondral cysts in the glenoid, partial loss of glenohumeral joint space.
- Superior subluxation of head of humerus.
- Suspicion of a small osteochondral fragment in axillary recess.

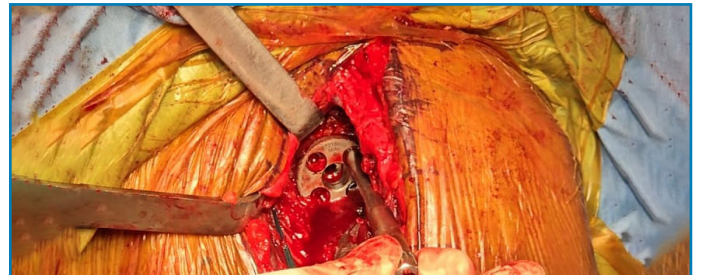
MRI IMAGES



Patient was operated for Reverse shoulder arthroplasty for left shoulder under general anaesthesia and right supraclavicular and interscalene brachial plexus block.



1. DELTOPECTORAL APPROACH



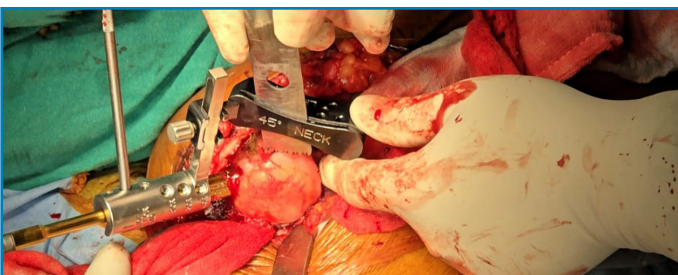
4. GLENOID BASEPLATE PLACEMENT



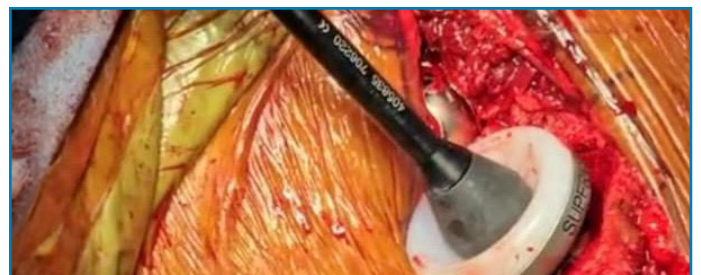
2. EXPOSURE OF HUMERUS



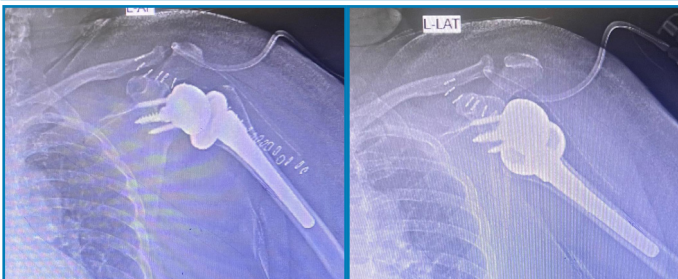
5. GLENSPHERE ATTACHMENT



3. HUMERAL PREPARATION

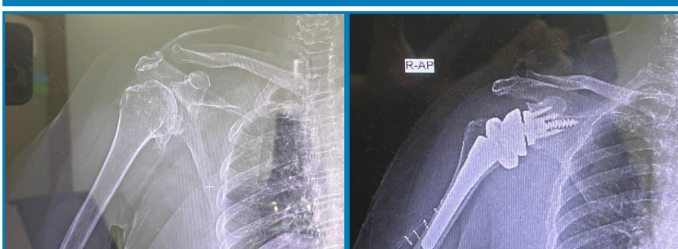


6. HUMERAL COMPONENT INSERTION



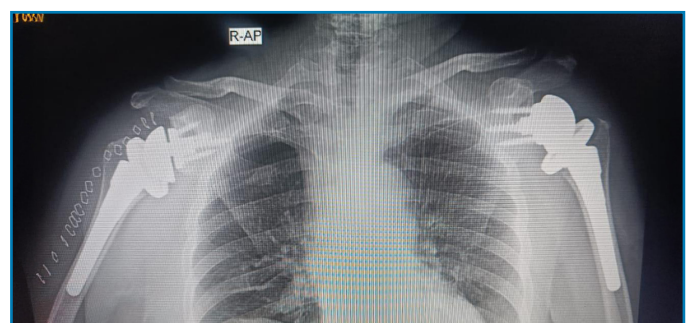
Post operative X rays of Left reverse shoulder arthroplasty

Due to persistence of pain and difficulty of right shoulder movements, Patient opted for reverse shoulder arthroplasty for right shoulder and was operated for the right shoulder.



Preoperative X-ray

Post operative X-ray



Post operative X-ray of Bilateral Reverse Shoulder Arthroplasty

MYTHS AND FACTS

Myth: It's only for elderly people.

Fact: RSA treats severe rotator cuff tears in younger, active people too, restoring function and quality of life.

Myth: You can't move your arm much after surgery.

Fact: Most patients regain good motion, often till overhead abduction

Myth: Pain is permanent after surgery.

Fact: RSA offers excellent pain relief (85-90% effective)

Myth: It's the same as a normal shoulder replacement

Fact: It is Biomechanically different prosthesis. The ball and socket are reversed: the ball goes on the shoulder blade (scapula), and the socket on the arm bone (Humerus).

Myth: The recovery process is extremely painful, long and difficult

Fact: Recovery requires dedicated physiotherapy and complete recovery is almost achieved by few weeks to months

Myth: The implant will fail quickly

Fact: Modern implants are durable and reliable, with promising midterm results

Myth: RSA outcomes are unpredictable

Fact: RSA has reliable, reproducible outcomes

Myth: RSA only used for Cuff tear disease

Fact: Also used for complex humerus fractures and failed conventional Shoulder replacements

Myth: Patient will not be able to sleep from that shoulder after Surgery

Fact: After recovery, patient can sleep in the position they want

Myth: It's too risky compared to other joint replacements

Fact: Highly successful procedure, complications comparable and even lower than hip and knee replacements

Myth: Patient needs to take painkillers forever after RSA

Fact: Only requires for few days for post-operative pain

Myth: Patient will not be able to carry heavy weight after surgery forever

Fact: After recovery person can easily engage in daily activities

Myth: The replacement will feel Unnatural

Fact: The replacement implants are designed to reproduce the smooth movement of your shoulder

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