ARTHROSCOPIC GIANT NEEDLE ROTATOR CUFF REPAIR AS A ROUTINE PROCEDURE SINCE 1990

A 10 minutes transhumeral footprint repair using only sutures
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Essential for this surgery: Patient in a sitting position not Beach chair

Advantage of neutral shoulder position, Gravity mild traction and easy operative manipulation
Anatomy in sitting position showing working area more than 5 cm away from the axillary nerve.
1. Patient in a sitting position with the arm hanging and the instrumentation table near the thigh
2. Thumb palpates the posterior angle of the acromion
3- Keeping the thumb on the angle of the acromion an 18-gauge lumbar puncture is placed into the subacromial space through the posteromedial portal which is approximately 1.5 cm medial to the angle of the acromion (the needle has to move freely through the space)
4- Keeping the thumb on the angle of the acromion the lumbar puncture is now placed into the subacromial space through the posterolateral portal which is approximately 1.5 cm below and anterior to the angle of the acromion (the needle has to move freely through the space)
5. A 5mm skin incision is made at the posterior portal
5. A 5mm skin incision is made at the posterolateral portal
7- Keeping the thumb on the angle of the acromion a sharp trocar is used to penetrate through the deltoid to the subacromial space. The tip of the instrument is directed toward the lower surface of the acromion.
8- Change from sharp to blunt trocar
9- Gently while feeling the lower surface of the acromion with the blunt trocar and the anterior acromio-clavicular border with the thumb and index finger to avoid reaching the deltoid mobilize the subacromial space from adhesions
10- The accessory fluid-ingress cannula is introduced through the posterior skin incision and is directed upward and anteriorly into the subacromial space.
11- The arthroscope and camera are attached. Irrigation fluid enters through the arthroscopic sheath to the proximal arm of the arthrosopic sheath (Gravity suction)
12- Palpate the AC joint with the index finger and mark the joint with the lumbar needle.
13-The medial measuring needle enters just anterior to the AC joint, and the tip descends to the level of the rotator cuff
14-The lateral measuring needle enters precisely at the anterolateral corner of the acromion. The vertically directed needle may palpate the bone lightly to ensure its proximity to bone before it is pushed down and into the subacromial space.
15- Open the accessory fluid-ingress cannula and let fluid fill the subacromial space
16- the lumbar puncture is now placed into the subacromial space through the antrolateral portal which is approximately 3 to 4 cm distal to acromion in a direct line with anterior edge. (the needle has to move freely through the space). It has to be directly above the tendon parallel to the floor. The horizontally directed needle may palpate the supraspinatus lightly to ensure its proximity to tendon before it is pushed medial and into the subacromial space. (This is important to ease suturing a rotator cuff tear)
17- A 5mm skin incision is made at the anterolateral portal
18- A sharp trocar is used to penetrate through the deltoid to the subacromial space. The tip of the instrument is directed toward the lower surface of the acromion.
19- A synovial shaver is passed through the antrolateral instrumentation portal.
20- Shaver bursectomy

- After removing the Bursa and adhesions below the acromion you can localise the coraco-acromial ligament which lies between the two measuring needles.
21- Do standardized subacromial decompression and remove with an acromionizer as much bone as a space of more than 1.2 cm measured with the needle is achieved.

Before SAD

After SAD
22- With a shaver deperiost the greater tuberosity just lateral to the articular surface of the humeral head
23- A Shallow trough is prepared just lateral to the articular surface and a hole through the cortical bone is made at the cartilage border for needle pass in order to have a wide foot print repair on the whole surface of the greater tuberosity.
24- A puncture through the cancellus bone is made through the hole in the cortical bone using an arthroscopy hook
25- Test the elasticity of the torn tendon. The torn tendon has to easily reach the lateral edge of the greater tuberosity.
26- Giant Needle Placement Guide

The scope is brought about one cm lateral to the edge of the tear with the arm in external rotation to have the edge also perpendicular to the scope. A guide fixed to the scope sheath which was set before inserting the sheath to bring the Needle tip exactly 2 cm in front of the scope tip is then adjusted and the giant needle is brought through the skin, the deltoid to about 1cm medial to the edge of the torn tendon.
27- Exit Guide

- Remove the placement guide and place the exit guide with one end on the entry point and the other in a posterolateral direction to localize the exit point of the needle.

- If the exit point is too distal (in case of small shoulders) then use the medium size or small size giant needle.
28- Pass the needle through the tendone, one cm medial to the tear edge in the prepared cortical hole.
The assistant has to internally rotate the shoulder to pass the tip of the needle in the cancellus bone.
30- A very important step

1- with your left hand hold the elbow of the patient from the assistant

2- place the needle holder 1cm above the skin entry of the needle.

3- hold the needle holder with your hand fro its needle end so that your thumb and index finger be in contact with the needle.

4- rotate the elbow with your left hand in CW and ACW directions while pushing the needle done with your right hand til you reach the skin

5- now place the needle holder another 1cm above the skin entry and repeat the procedure till you see or feel the tip of the needle coming out through the skin.
31- The direction of pushing the needle should always be postrolateral in order to avoid the hard bony substance at the bicipital groove.

Pull the needle with the needle holder in the same 1cm stepwise manner as pushing it inside.
32- Pull the lower end of the suture

- Pull the posterior part of the suture from its exit point from the shaft with an arthroscopy hook out through the instrumentation portal
- The hook is first brought to the trough and with bone contact go done and up along the shaft while pulling tightly on the suture till you feel the suture and then pull them out
- The anterior suture end has to be cached with a clamp to avoid pulling the whole suture
33- Pull the upper end through the instrumentation portal with a ring forceps

- Advise to pull only one suture and leave the other to ease the knot tying process through the instrumentation portal.
- The posterior suture end has to be hold with a Kocher clamp in order not to pull the whole suture out.
The technique recommended is the Giant knot with the concave knot pusher.
Initial knot is a sliding oneway self-locking knot in which locking occurs by pulling on loop.
35- Sliding the knot inside the goint

- After making the knot outside slide it inside using the concave aeratec or arthrex knot pusher by pushing the knot with the driver inside and pulling the loop till you reach the tendon and then block the knot.
36- If easy sliding was not possible

- This may rarely happen – then push the knot pusher to the tendon, then fix it there on the knot.
- Now pull each end of the suture alone to get the complete slide and placement.
After placing and locking the knot the suture remains can be cut
37- Giant needle complex

- Using two giant needles a giant needle complex can be made which is two simple sutures and one mattress suture
Arthroscopic transhumeral rotator cuff repair
Giant needle technique

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