Clinical Outcome of Arthroscopically Assisted Trans-Axillary First Rib Resection for Thoracic Outlet Syndrome

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COI Disclosure Information

Present: Yusuke Iwahori M.D.

I have no financial relationships to disclose.
1st report of transaxillary approach to first rib resection to relieve TOS

Purpose

to investigate clinical outcomes of arthroscopically-assisted trans-axillary 1st rib resection (ATAFR) for refractory thoracic outlet syndrome (TOS)

Indication of transaxillary 1st rib resection for TOS

Failure of a thorough conservative tx
Apparent stenosis of SCA or SCV on CT angiography
C8 or Th1 axonal degeneration on EMG

<Exclusion criteria>
Traction type TOS (sloping shoulder, positive Eden)
Neck trauma
Accompanied by long thoracic nerve palsy
Patients

16 cases undergone ATAFR for TOS
Post-op F/U over 1y

Method

Evaluation items

Patients demography
Image findings: CT-angiography, 3D-CT
EMG findings
Surgical procedure
Surgical Complications
Postop. clinical evaluation: Derkash’s classification
Quick DASH
Postop. return to sports activities
Arthroscopically assisted surgical procedure

Anesthesia: General

Position: Lateral decubitus with the arm abducted 100 degrees on an arm stand
Arthroscopically assisted surgical procedure

Mid. Scalene m  Ant. Scalene m  Mid. Scalene m

Dissection of Mid. Scalene m

1st rib

Pleural

1st rib

Piece by piece resection of 1st rib

SCA  SCV

Pleural

Post-op 3D-CT
Age at the surgery: mean 21.5 y.o. (16-39 y.o.)
Gender: Male 7, Female 9
Disease duration: mean 15.8m (3m-27y)
TOS type: Compression type 10, Combined type 6
  Arterial type 9, Neurogenic 7
Accompanied pathology:
  QLSS 4, Cubital tunnel syn 3
  Loose shoulder. 1
  Obsessional neurosis 1, Panic disorder 1
Sports participant: 12 cases, duration: mean 4.2y (1-14y)
  Baseball 6, Basketball 3, Volleyball 2, Badminton 1
Conservative tx duration: mean 4.2m (2-10m)
Post-op F/U: mean 1.9y (1.2-5.8y)
3D-CT angiography or MRI angiography

Apparent stenosis of SCA with the arm elevated arm: 8/16 cases (50%)

Bony abnormality

Cervical rib
1 case

1st rib stress fracture
1 case

2/16 cases (18.7%)

EMG findings
C8 or Th1 axonal degeneration: 12 cases (83.3%)
Intraoperative findings

Fibrous band: 10/16 (62.5%)
Fibrosis in the scalene muscle: 5/16 (31.3%)
Hypertrophy of the scalene muscle: 6/16 (37.5%)

Surgical complication

Pneumothorax: 2/16 (12.5%) → heal with chest drainage
Transient paresthesia worsening in the affected arm: 5/16 (31.3%)
Post-op clinical results

Derkash’s classification: Excellent 8, Good 5, Fair 3, Poor 0

Quick DASH: Pre-op mean $45.8 \pm 6.8$ [p<0.001 Paired T test] Post-op mean $17.3 \pm 3.2$

Return to sports activity duration (n:12): mean $4.7$mo (3-8)

Level of return to sports activity (n:12)

- Complete: 4 ($33.3\%$) Complete return: 58.3%
- Slight level down: 4 ($33.3\%$)
- Position change: 3 cases ($25.0\%$)
- Difficult to continue competition level: 1 ($8.3\%$)*
- Unable to return: 0
- ADL disability: 0

* Loose shoulder case
Arthroscopically assisted procedure

Good & bright visualization
Comfortable physical position
Share a surgical field with assistants


Conventional open procedure with a head lamp
Arthroscopically assisted trans-axillary rib resection was effective surgical technique for refractory TOS.

Arthroscopically assisted procedure could provide good surgical field.