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Single-incision Eden-Lange procedure in trapezius muscle paralysis: A report of 11 cases☆

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ABSTRACT

Objective: The aim of this study was to evaluate the outcome of single-incision Eden-Lange procedure in trapezius muscle paralysis.
Methods: The medical records of 11 patients (3 females and 8 males); mean age: 41 (25–59) years with trapezius muscle paralysis who underwent Eden-Lange procedure in our Center, between February 2009 and April 2013, were retrospectively analyzed. The clinical outcomes were evaluated with the American Shoulder and Elbow Surgeons Shoulder (ASES) score and visual analogue scale (VAS).
Results: The mean duration of symptoms before surgery was 10.18 months. The average duration of follow-up was 33.5 (24–48) months. The mean VAS score improved from 7.8 to 1.6 points ($p < 0.05$). The total ASES improved from 32.8 to 82.1 points ($p < 0.05$). The mean range of motion in forward elevation and abduction increased significantly from 121.80 to 154.40 ($p < 0.05$) and 80.00 to 148.18° ($p < 0.05$), respectively.
Conclusion: Single incision Eden-Lange procedure appears to be a safe and effective treatment option for the patients with trapezius muscle paralysis.
Level of evidence: Level IV, therapeutic study.

Introduction

Scapular winging is a well-known condition and a rare cause of shoulder girdle muscle weakness.[1] Paralysis of the serratus anterior and trapezius muscles due to long thoracic and spinal accessory nerve injury, respectively are the most common cause of this condition.[2] In terms of prevalence, trapezius muscle paralysis, as the cause of scapular winging, is rare and as such, its diagnosis is difficult.[3] The awareness about accessory nerve injury during cervical surgery and newer surgery technique have lowered the incidence of scapular winging.[3,4] The most common symptoms of the trapezius muscle paralysis are pain, weakness, inability to perform abduction, and eventual restrictions on all overhead activities. Electromyography (EMG) is the definitive study for the evaluation of scapular winging that originates from muscular or neurologic abnormalities.[5,6] There may also be cases of scapular winging, in which the EMG finding shows normal; therefore, clinical suspicion should remain high regardless of the test result.[7] Efficient improvement of trapezius muscle caused by spinal accessory nerve injury does not always derive a benefit from conservative management.[8] Conservative treatments known to have failed include transcutaneous nerve stimulation, NSAIDS, scapular brace, physical therapy, stretching and strengthening exercise.[9] These treatments in patients have poor prognosis and as such, most surgeons usually suggest surgical treatment. Neurolysis, nerve graft, or repair may be attempted to the spinal accessory nerve if performed within 6–12 months.[11] It has been reported that the choice of surgical procedure in patients with trapezius muscle paralysis is Eden-Lange,[10] in which the surgeon transfers the tendon of the levator scapulae to the scapular spine and then, reattached the tendon of rhomboid minor and major to the scapular body.[10,11] The Eden-Lange surgery mainly results in good to excellent outcomes, with adequate relief of pain and functional overhead movements.[4,10] Therefore, this study aimed to review the causes and symptoms of scapular winging, and report the good experience in this field.

☆ Location of research: Shafa Orthopedic Hospital.

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Materials and methods

In this study, 11 consecutive patients, who were referred to our center and operated for scapular winging due to spinal accessory nerve injury between February 2009 and April 2013, were reported. Accessory nerve injury, based on examination and electromyography, was documented within the records of all cases. All patients had been under physiotherapy before the surgery, for at least 6 months to strengthen the muscles around the shoulder. The senior author performed all the surgeries using the Eden-Lange technique. The inclusion criteria included accessory nerve injury with failed nonoperative treatment for more than 6 months, and obvious atrophy of trapezius muscle without any improvement in shoulder symptoms during the last 2 months (Fig. 1a–d). Exclusion criteria included the presence of previous shoulder pain or disease, report of malignancy of the cervical lymph node biopsy and patients above 60 years of age.

Pre-operative evaluation

All the relevant data were obtained from the patients' hospital records including demographic information, age, sex, dominant hand and involved limb. The patient's shoulder function was assessed using shoulder pain VAS and ASES score. The active ROM in forward elevation and abduction was measured using a goniometer.

Surgical technique

After general anesthesia, on prone positioning of the patient, prep and drape was done from the base of the neck and medial border of the opposite scapula to the entire affected upper limb. The hand was placed on the lumbar region to make a “chicken wing” position for the scapula to prevent any possible damage to the chest. The body of the scapula was marked and a longitudinal incision, 3 cm superior to the spine of the scapula toward its inferior angle, was done. Thereafter, trapezius was dissected from its attachment to the scapular. The supraspinatus and the infraspinatus muscles were identified and the scapula was peeled off 7 cm laterally. A longitudinal osteotomy was performed in order to detach the levator scapulae and rhomboid muscles from the superomedial angle medial border of the scapula, respectively with a shell of bone (Fig. 2a). Multiple drill-holes were created in the infraspinatus fossa and on the scapular spine, all were approximately 5 cm lateral from the medial border of the scapula (Fig. 2b).

The levator scapula muscle advanced laterally and attached to the scapular spine with two Krackow suture using heavy nonabsorbable sutures. Similarly, both rhomboid muscles were attached to the infraspinatus fossa (Fig. 2c). Caution was made to keep bone-to-bone contact between the fragment and the scapular bone for better healing. The wound was closed in layers and dressed.

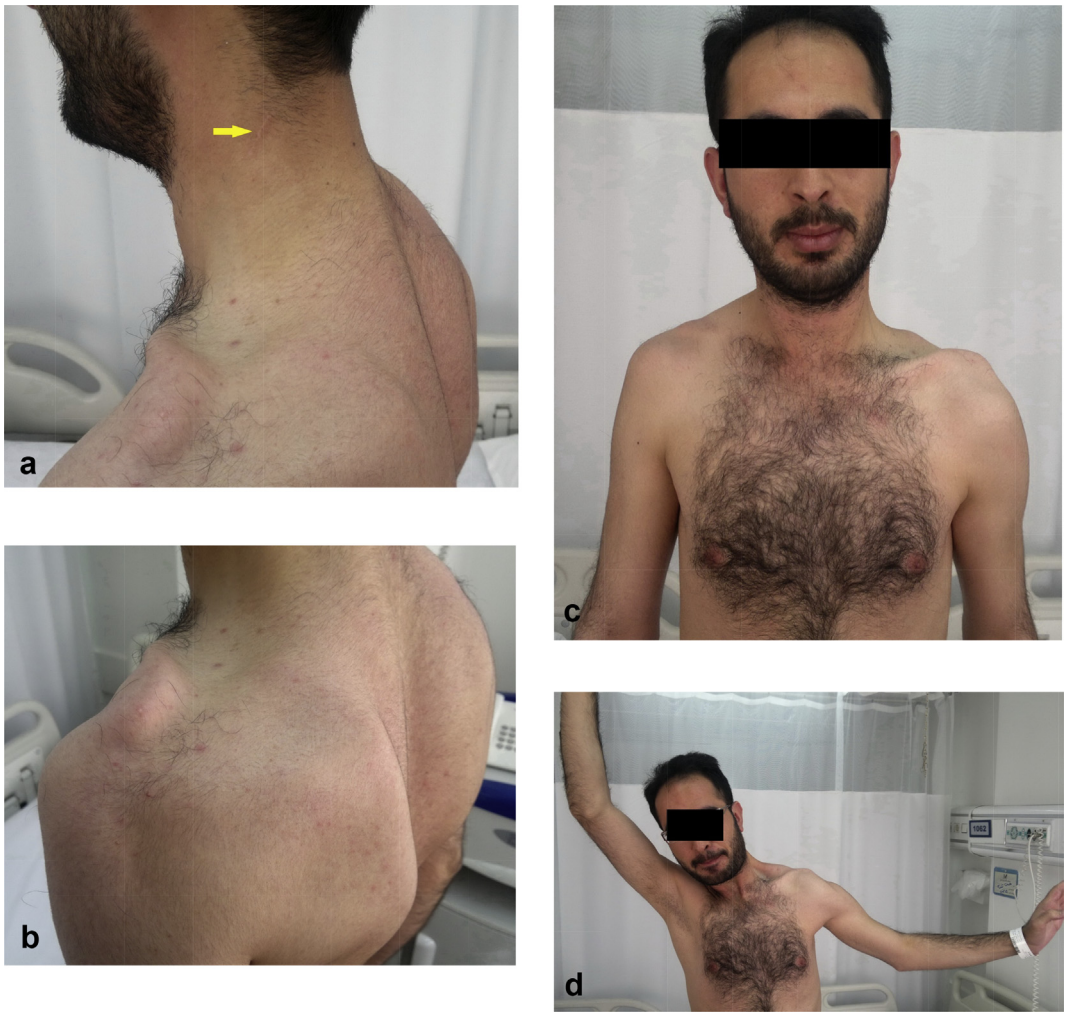

Fig. 1. (a) Photograph shows previous site of biopsy from cervical lymph node, (b, c) atrophy of trapezius muscle, (d) Limited range of motion in abduction.

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