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Partial transfer from C7 root to spinal accessory nerve for trapezius palsy

Transfert partiel de la racine C7 sur la branche externe du nerf accessoire pour paralysie du trapèze

1. Introduction

Trapezius palsy after spinal accessory nerve (SAN) injury is not uncommon. Iatrogenic lesions after lymph node resection are the most frequent cause [1–3], but there are other etiologies [4–6]. In cases of recent injury (less than 6 months), nerve surgery is generally indicated. Direct nerve suture is generally possible; nevertheless, a graft is sometimes necessary because of a nerve defect. However, stumps of the proximal or distal nerve are sometimes difficult to find because of significant fibrosis. When the SAN's proximal end is not found, the SAN cannot be repaired. Therefore, we proposed a new technique of partial transfer from C7 root to SAN for reanimation of the trapezius muscle.

2. Clinical report

A 40-year-old male presented trapezius palsy after a lymph node biopsy. A completely atrophied trapezius muscle was

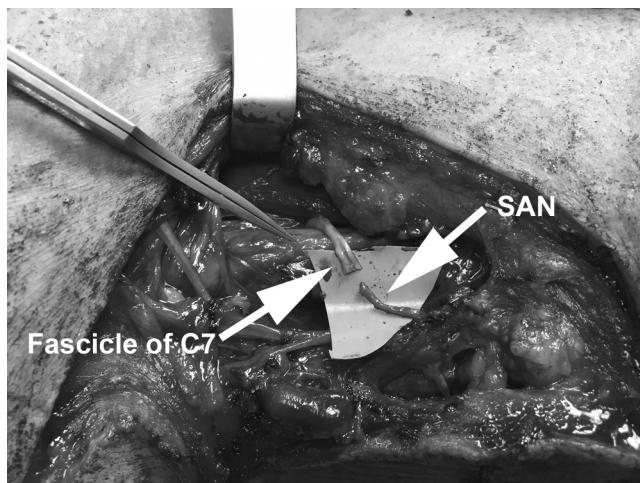


Fig. 1. Transfer of a fascicle from the C7 root (C7) to the spinal accessory nerve (SAN). The fascicle was chosen with electrical stimulation, looking for pectoralis major contraction. Microsurgical suture can be performed without any tension.

present and electromyography confirmed the diagnosis of SAN injury with trapezius muscle denervation. The time before surgery was 5 months. During cervical exploration, the proximal SAN stump was not retrieved because of extensive fibrosis. A partial transfer of the C7 root was decided upon.

The omohyoid muscle was divided, revealing the phrenic nerve on the scalenus anterior muscle and the C5 and C6 roots behind the posterior border of the scalenus anterior muscle. Hemostasis of the transverse cervical artery was performed and C7 was exposed. Epineurotomy was performed on the C7 root to separate the fascicles. Electrical stimulation was used to choose the fascicle for the pectoralis major muscle only, starting with low intensity current (0.02 mA). The chosen fascicle was dissected from the rest of the C7 root over 2 cm and divided distally. The fascicle was turned laterally and superiorly toward the SAN (Fig. 1). Suturing was performed under the microscope with three separate 11-0 nylon sutures and protected with fibrin glue. The skin was closed with interrupted sutures.

Postoperatively, the entire upper limb was placed in a shoulder spica cast, with the elbow in 90-degree flexion with a cervical collar for 3 weeks. Then, active range of motion of the shoulder was performed for 3 weeks. As soon as the first trapezius muscle contraction occurred, active exercises and TENS stimulation were initialized.

Re-innervation of the trapezius muscle started after 6 months. At 24 months of follow-up, trapezius muscle strength was M4 according to Medical Research Council scoring.

No complications occurred at the pectoralis major or elbow, wrist or fingers extension palsy.

3. Discussion

Trapezius palsies are not rare; lymph node biopsy or removal is the main cause of SAN injuries. Early management is necessary to obtain the best possible muscle recovery. Early cervical exploration is generally justified to improve results [6,7]. When the SAN's distal and proximal stumps are intact, direct suture is the best solution and leads to the best results [1]. When a nerve graft is necessary, muscle recovery is generally worse [1]. Lastly, if the proximal stump is in poor condition or not retrieved because of radiation therapy or significant fibrosis, nerve transfer may be indicated.

Partial transfer from C7 roots is usually performed in complete brachial plexus palsy cases from the contralateral C7

root when no donor nerves are available [8]. In these cases, one of the fascicles to the pectoralis major muscle is harvested and sutured to a long graft to the target nerve. But complications can occur when the total C7 root is harvested [9]. However, complications such as motor or sensory deficit are rare and transient in hemi-contralateral C7 root transfer [10]. Moreover, in our transfer, we only used one fascicle from the pectoralis major. This muscle's multiple innervation from C7 to T1 explains the absence of neurological complications after harvesting only one fascicle. Electrical stimulation, however, has to be accurate. As a matter of fact, if low-level stimulation induces elbow, wrist or finger extension in addition to pectoralis major contraction, this fascicle must not be harvested.

This transfer was a direct motor transfer. The distance between the suture site and the muscle is short, enabling faster recovery – only one nerve suture is necessary. It may be used instead of nerve grafting to improve muscle recovery. However, this hypothesis needs to be confirmed with more patients.

Disclosure of interest

The authors declare that they have no competing interest.

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