Subclavius Posticus Muscle: Supernumerary Muscle as a Potential Cause for Thoracic Outlet Syndrome

PAU FORCADA, * MARC RODRÍGUEZ-NIEDENFÜHR, MANUEL LLUSÁ, AND ANNA CARRERA

Department of Morphological Sciences, University of Barcelona, Barcelona, Spain

During routine dissection a subclavius posticus muscle was found on the left side of a male cadaver. This muscle arose from the upper margin of the scapula and transverse scapular ligament, inserted in the superior side of the first rib cartilage, and was innervated by a small branch from the suprascapular nerve. The anatomical relationships of the supernumerary muscle with the brachial plexus and the subclavian artery is suggestive of a possible cause of the thoracic outlet syndrome and therefore of clinical significance. Clin. Anat. 14:55–57, 2001.

© 2001 Wiley-Liss, Inc.

Key words: neck; muscle; variation

INTRODUCTION

The thoracic outlet syndrome is a widely studied complex of signs and symptoms caused by compression of the neurovascular structures at the thoracic outlet region. Three different locations are related to the genesis of this compression syndrome, viz. the interscalene triangle, the costoclavicular space and the pectoralis minor region (Atasoy, 1996; Fernández-González and Suárez-Fernández, 1998; Kirgis and Reed, 1948; Nichols, 1986; Ranney, 1996; Remy-Jardin et al., 1997; Riddell and Smith, 1986; Roos, 1976). In the first location it has been associated with anomalies of the scalenus muscles (Harry et al., 1997; Kirgis and Reed, 1948), anomalies in the first rib or the presence of cervical ribs (Nichols, 1986; Riddell and Smith, 1986; Roos, 1976). The costoclavicular space could be too narrow due to variations of the clavicle and also the first rib, or structural changes of the subclavius muscle and therefore compress the brachial plexus and subclavian artery (Fidler et al., 1984; Nichols, 1986). Compression in the pectoralis minor region due to hyperabduction syndrome can also take place (Fernández-González and Suárez-Fernández, 1998; Nichols, 1986).

Variations of the omohyoid muscle and the presence of an anomalous sternoclavocervical muscle have been cited as causes of compression syndrome (Nichols, 1986). The presence of other supernumerary muscles in the lateral region of the neck has not been found to be an etiological factor in compression syndromes such as those in the regions of the wrist and the ankle (Robinson, 1985; Sammarco and Stephens, 1990).

In this report we describe a subclavius posticus muscle. This muscle has been reported in the anatomic literature (Akita et al., 1996; Bergman et al., 1988; Gruber, 1879; Wood, 1865) but to our knowledge it has not been mentioned as a possible cause for thoracic outlet syndrome, in spite of its close relationship to the brachial plexus and subclavian artery.

MATERIALS AND METHODS

During routine dissection in the dissection room of the Department of Morphological Sciences (University of Barcelona) a supernumerary muscle in the lateral neck region was observed. The clavicle and the subclavian vein were removed to allow a better view of the supernumerary muscle and its relationships with the brachial plexus and its branches and the subclavian artery. Special attention was paid to preserve its nerve supply.

RESULTS

A subclavius posticus muscle was found on the left side of a male cadaver during routine dissection.

This muscle was attached to the upper margin of the scapula and the transverse scapular ligament, par-
tially covered by the the scapular insertion of the posterior belly of the omohyoid muscle. The muscle coursed inferiorly and medially, just lateral to the posterior belly of the omohyoid muscle, crossed over the cranial portion of the anterior serratus muscle and inserted in the superior side of the first rib cartilage (Fig. 1A). At its insertion, the variant muscle was fused with the normal subclavius tendon.

The muscular belly had a triangular form, 16 mm wide at its base on the scapula and 8 mm wide at its vertex in the clavicle. Its length was 80 mm (Fig. 1A).

The brachial plexus originated from C5 to T1 roots, emerged between the anterior and middle scalenus muscles and formed the superior and middle trunks just before passing behind the subclavius posticus muscle. The surface of the brachial plexus in contact with the muscle showed a groove (Fig. 1B) which could be interpreted as a sign of compression. The inferior trunk of the brachial plexus was located deeper than the superior and middle trunks and did not exhibit signs of compression.

The suprascapular nerve was normal in its origin from the brachial plexus, but gave origin to a small branch to the subclavius posticus as it passed behind the muscle.

The subclavian vessels were normal in their relationships in the interscalene triangle. The artery and vein were separated by the anterior scalenus muscle before they passed under the subclavius posticus muscle. Just before crossing under the muscle, the artery showed a dilatation (Fig. 1B) which, in addition to the brachial plexus groove, could have resulted from compression.

The suprascapular artery crossed behind the chondral attachment of the muscle to get to its lateral side and passed parallel with it to the scapular notch (Fig. 1B).

**DISCUSSION**

Anatomical variations in the neck can have clinical significance and are important for surgeons performing surgical procedures in this region. The presence of muscular variations or accessory muscles has been recognized as causes of neurovascular compression in the cervico-axillary region (Atasoy, 1996; Kirgis and Reed, 1948; Nichols, 1986; Ranney, 1996) and in other body regions such as the wrist and ankle (Robinson, 1985; Sammarco and Stephens, 1990). To our knowledge however, the presence of a supernumerary subclavius posticus muscle related to neurovascular compression has not been reported in the clinical literature. The anatomical relationships with the brachial plexus and the subclavian artery as found in the present finding is suggestive of a possible cause of the thoracic outlet syndrome and therefore of clinical significance. The fact that the supernumerary muscle produced a groove in the brachial plexus and a dilatation of the subclavian artery supports this idea.

Variations in the insertion of the anterior scalenus muscle have been related to venous compression syndromes in the root of the neck and difficulty in the cannulation of the subclavian vein (Roos, 1976; Wayman et al., 1993). This might also be true of the subclavius posticus muscle due to its anterior insertion in the first rib cartilage.

In the anatomical literature, several references exist about muscular variations extending from the costoclavicular space to the scapula (Akita et al., 1996; Bergman et al., 1988; Fedoroff, 1927; Gruber, 1875, 1879; LeDouble, 1897; Macalister, 1875; Steinback, 1923; Wood, 1864, 1865, 1867, 1868, 1870). There is no unanimity on the nomenclature of these supernumerary muscles, with different names based on differences in origin and insertion.
Variations of these supernumerary muscles can be classified into two groups related to the scapuloclavicular muscle and the sternochondroscapular muscle (Le-Double, 1897). The first group is represented by the scapuloclavicular muscle which originates from the upper margin of the scapula, transverse scapular ligament or coracoid process, and inserts in the inferior side of the clavicle (Fedoroff, 1927; Gruber, 1875; Wood, 1865). A variation of this muscle is the scapulocostoclavicular muscle, which inserts also on the first rib (Gruber, 1879).

The second group of variations is represented by the sternochondroscapular muscle which arises from the upper margin of the scapula and inserts in the first costal cartilage and sternum (Fedoroff, 1927; LeDouble, 1897; Wood, 1864). The absence of its costal origin has been described as the sternocapsular muscle and the absence of its sternal insertion as the chondroscapular, subclavius posticus or scapulocostalalis minor of Gruber which is similar to our finding (Akita et al., 1996; Bergman et al., 1988; Gruber, 1879; Macalister, 1875). Although almost all the latter muscles have been reported as casual findings, their overall incidence has been established as around 2% (Wood, 1870).

The above mentioned anomalies have been considered variations of the omohyoid muscle (Buntine, 1970) or variations of the subclavius muscle (Akita et al., 1996). To determine the origin of these muscles, it is necessary to consider their innervation (Akita et al., 1996). When the nerve supply comes from the ansa cervicalis, the muscle is considered a variation of the omohyoid muscle, whereas when it is supplied by the brachial plexus it is thought to be a variation of the subclavius muscle. Therefore, we can consider our muscle as a variation of the subclavius muscle because its innervation was provided by the suprascapular nerve and not the ansa cervicalis.

We believe all the above muscles can be possible causes of neural or vascular compression syndromes and therefore should be kept in mind by the physician during physical exploration. They could be confirmed by MRI (Collins et al., 1995).

REFERENCES


