Compression of the Neurovascular Bundle Above and Below the Clavicle

Thoracic Outlet Syndrome and Pectoralis Minor Syndrome

Baltayiannis N

Thoracic outlet syndrome (TOS) is a condition in which there is compression of the nerves, arteries, and/or veins in the passageway from the lower neck to the armpit. There are three main types: neurogenic, venous, and arterial. The neurogenic type is the most common and presents with pain, weakness, and occasionally loss of muscle at the base of the thumb. The venous type results in swelling, pain, and sometimes bluish discoloration of the arm. The arterial type results in pain, coldness, and paleness of the arm [1,2,3].

In 1945 Wright described a syndrome characterized by neurovascular symptoms in the upper extremities following repeated and prolonged assumption of the position of hyperabduction. The postural attitude responsible for the symptoms was one in which the arms were brought together above the head with the elbows flexed. This position is frequently assumed in sleep, but to lesser degrees it is practiced repetitively in certain occupations such as those of grease pit mechanics and painters [4,5].

Wright introduced the term pectoralis minor syndrome (PMS) as a “neurovascular syndrome produced by hyperabduction of the arms” [5].

More recently, Nigro and co-workers have emphasized the role of the pectoralis minor tendon, and its division in the alleviation of vascular compression during hyperabduction. The subclavian artery and vein may be stretched and acutely angulated (acute effort thrombosis of the subclavian vein) as they pass beneath the pectoralis minor tendon in the position of hyperabduction [6,7].

Compression of the neurovascular bundle supplying the upper extremity can occur above or below the clavicle; TOS is due to compression above the clavicle and PMS below. More than 90% of cases involve the brachial plexus,

PMS commonly accompanies neurogenic TOS, but frequently presents alone. Its recognition is important, as many patients with suspected neurogenic TOS can be treated

successfully by simple, essentially risk-free, pectoralis minor tenotomy. Should this fail, thoracic outlet decompression can always be performed at a later date [9].

Axillary venous obstruction by the pectoralis minor must be distinguished from subclavian vein obstruction, which presents with similar symptoms. Pectoralis minor tenotomy is a simple, risk-free, outpatient procedure that has produced uniformly good results [10].

This editorial refers to the two cases presented by Rizniotopoulou PA, et al and associates entitled: “Pectoralis minor syndrome. Report of two cases and review”, published in this journal [11].

References

1. Ferrante MA, Ferrante ND. The thoracic outlet syndromes: Part 1. Overview of the thoracic outlet syndromes and review of true neurogenic thoracic outlet syndrome. *Muscle Nerve* 2017;55:782–93.
2. Hussain MA, Aljabri B, Al-Omran M. Vascular Thoracic outlet syndrome. *Semin Thorac Cardiovasc Surg* 2016;28:151–7.
3. Mackel M. Thoracic outlet syndrome. *Curr Sports Med Rep* 2016;15:71–2.
4. Wright IS. The neurovascular syndrome produced by hyperabduction of the arms. *Am Heart J* 1945;29:1.
5. Beyer JA, Wright IS. Hyperabduction syndrome with special reference to its relationship to Raynaud's syndrome. *Circulation* 1951;4:161.
6. Nigro R, Reina G, Caramuta U. Acute thrombosis of the axillary vein (minor pectoralis muscle syndrome). Considerations on 3 surgically treated cases. *Minerva Cardioangiol.* 1979;27:227–32.
7. Lord JW Jr, Stone PW. Pectoralis minor tenotomy and anterior scalenotomy with special reference to the hyperabduction syndrome and effort thrombosis of the subclavian vein. *Circulation* 1956;13:537–42.
8. Sanders RJ, Annest SJ. Thoracic outlet and pectoralis minor syndromes. *Semin Vasc Surg* 2014;27:86–117.
9. Sanders RJ, Annest SJ. Pectoralis Minor Syndrome: Subclavicular Brachial Plexus Compression. *Diagnostics (Basel)*. 2017;7. doi: 10.3390/diagnostics7030046.
10. Abdallah M, Wehbe MR, Elias E, et al. Pectoralis Minor Syndrome: Case presentation and review of the literature. *Case Rep Surg* 2016; ID 8456064.
11. Rizniotopoulou PA, Apostolou CE, Fountoukis TN, et al. Pectoralis minor syndrome: Report of two cases and review. *Hellenic J Surg* 2017;89:149–52.

Baltayiannis N MD, PhD,
Department of Thoracic Surgery, “Metaxa” Cancer Hospital,
Piraeus, Greece

Corresponding author: Baltayiannis Nikolaos MD, PhD,
Department of Thoracic Surgery, “Metaxa” Cancer Hospital,
Mpotasi 51, 18537, Piraeus, Greece
e-mail: baltayiannisn@yahoo.gr