

Case Report

Unusual neural arborization in Axilla-Case Report

S Gandhi¹, J Arora², V Mehta³, R K Suri⁴

¹Assistant Professor, Department of Anatomy Dr. R.M.L Hospital, PGIMER, New Delhi, India; ²Professor, ³Professor and Head, ⁴Director Professor, Department of Anatomy Vardhaman Mahavir Medical College and Safdarjang Hospital, New Delhi, India

Abstract

The present paper attempts to highlight a rare case of neural arborization in axilla. Anatomical knowledge of variations in branching pattern of intercostobrachial nerve and medial cord of brachial plexus is essential for surgeons while conducting complicate dissection during mastectomy and other procedures involving the axilla. Intercostobrachial nerve is a vital structure which is sometimes damaged during axillary node dissection during mastectomy. This leads to an unfortunate sequelae of pain and paraesthesia. Intercostobrachial nerve is often also sacrificed during mastectomy. Hence awareness of variations of intercostobrachial nerve are of utmost importance to the present day anatomists and surgeons. The present study reports a unique unusual communication between the medial cord of brachial plexus and the intercostobrachial nerve associated with another communication between intercostobrachial nerve and third intercostal nerve. Knowledge of such rare variations is imperative for surgeons to avoid and hence minimize the risk of iatrogenic injury to medial cord, intercostobrachial nerve and third intercostal nerve.

Keywords: Intercostobrachial nerve; Third intercostal nerve; Axilla

Corresponding author: Dr. Swati Gandhi Assistant Professor ,Department of Anatomy ,Dr. R.M.L Hospital,PGIMER,New Delhi, India.E-mail: swatig2883@yahoo.com

This article may be cited as : Gandhi S, Arora J, Mehta V ,Suri K. Unusual neural arborization in Axilla-Case Report .Int J Com Health and Med Res 2015;1(1):26-9

Article Recieved 1-11-15

Accepted On: 14-12-2015

INTRODUCTION

Knowledge of neural variations in the region of axilla is of great clinical importance, especially in mastectomies and various axillary surgeries. The intercostobrachial nerve is a lateral

cutaneous branch of the second intercostal nerve and supplies the medial side of the arm and floor of the axilla. Due to its communication with a branch of the medial cutaneous nerve of the arm, it also supplies the medial and posterior aspects of the arm.¹ The few variations regarding the branching

pattern of intercostobrachial nerve and brachial plexus have been described in the literature. The understanding of these variations are clinically important in diagnosis and treatment of various medical conditions. In 30% of cases, intercostobrachial nerve communicates with the medial cord of the brachial plexus and bears few intrathoracic connections. Injury to intercostobrachial nerve is the most common complication of axillary node dissection during mastectomy which further results in pain and paresthesias. Furthermore, brachial plexus injuries are very common in surgical procedures of axilla such as axillary nerve block, fixation of humeral fracture, surgical resection of axillary tumors, repair of shoulder dislocation, vessel and nerve repair after trauma, radical mastectomy, lymph node biopsy, and lymphadenectomy of the axilla.

Precise anatomical insight of the branching pattern of neural variants and their communications is extremely relevant in traumatology of the arm, as well as in reconstructive procedures. Hence, this case report presents a rare variant in the constitution and disposition of intercostal nerves in the region of axilla, knowledge of such rare variations would be imperative for surgeons to avoid and thus minimize the risk of iatrogenic injury to medial cord, intercostobrachial nerve and third intercostal nerve.

CASE REPORT

We encountered a rare variant in the constitution and disposition of intercostal nerves in the region of axilla in a 50 year old male cadaver during the course of preclinical educational training programme for undergraduate medical students. A communicating twig (figure 1) measuring 5.1 cm in length was observed between intercostobrachial nerve and medial cord of brachial plexus. Part of the intercostobrachial nerve proximal to its union with the communicating twig measured 2.5 cm in length and the part distal to the communicating twig was 1.1 cm long. The intercostobrachial nerve eventually divided into an anterior and posterior divisions. The anterior division measured 5.5 cm in length and it innervated the subcutaneous tissue in the region of the upper part of anterior border of latissimus dorsi. The posterior division of intercostobrachial nerve was 3.5 cm long and joined the lateral cutaneous branch of the third

intercostal nerve. The part of third intercostal nerve proximal to its union with posterior division of intercostobrachial nerve measured 6 cm in length. The distal part of lateral cutaneous branch of third intercostal nerve which measured 4.5 cm (caudal to the termination of intercostobrachial nerve) continued to supply subcutaneous tissue in the region of upper part of anterior border of latissimus dorsi. This branch terminated 1 cm caudal to the intercostobrachial nerve. The thoracodorsal nerve was found piercing the latissimus dorsi close to its anterior border in association with terminal part of subscapular artery. It was found to originate as usual from the posterior cord and occupied a deeper plane with respect to intercostal nerves. The thoracodorsal nerve coursed inferolaterally while the branches from second and third intercostal nerves coursed horizontally. Other axillary neurovascular structures displayed normal anatomical disposition.

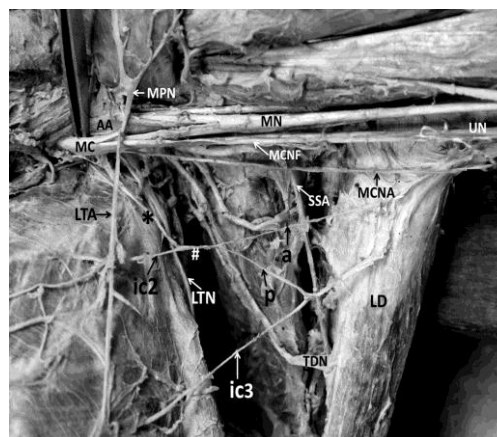


Figure 1: Shows rare variant in the constitution and disposition of intercostal nerves in the region of axilla

- MC- Medial cord
- MN- Median nerve
- MPN- Medial pectoral nerve
- MCNA- Medial cutaneous nerve of arm
- MCNF- Medial cutaneous nerve of forearm
- UN- Ulnar nerve
- LTN- Long thoracic nerve
- LTA- Lateral thoracic artery
- TDN- Thoracodorsal nerve

LD- Latissimus dorsi muscle
IC2- Second intercostal nerve
IC3- Third intercostal nerve
AA- Axillary artery
SSA- Subscapular artery
*- Communicating twig
#- Communicating twig

DISCUSSION

Literature indicates various variations of intercostobrachial nerve.^{2,3} The intercostobrachial nerve takes origin from the second intercostal nerve as if it was a lateral cutaneous nerve. The intercostobrachial nerve pierces the intercostal muscles of second intercostal space, the serratus anterior in the mid-axillary line and crosses the axilla where its posterior branch provides sensations to posterior axillary fold. The nerve courses into the arm along its posteromedial border and supplies skin of this region.⁴ Studies have reported communication between the medial cord and intercostobrachial nerve.⁵ Accidental injury or surgical removal of intercostobrachial nerve during axillary dissection may lead to pectoral muscle motor loss in addition to the commonly reported sensory loss resulting from injury to intercostobrachial nerve. The present study reports dual communication between medial cord and intercostobrachial nerve as well as between intercostobrachial nerve and third intercostal nerve. Awareness of these anatomical neural variations is of utmost importance while dealing with medial cord and intercostobrachial nerve during surgical procedure of axilla. Damage to intercostobrachial nerve is a common complication of axillary node dissection performed during mastectomy. Surgical exposure of the long thoracic and thoracodorsal nerves also involves identification of medial position of intercostobrachial nerve for its preservation. Knowledge of variations as reported in our study is therefore extremely important for anatomists, radiologists, anesthesiologists and surgeons which may contribute to the explanation of diagnosis and surgical treatment and further may prevent any postoperative complications. Studies report that preservation of intercostobrachial nerve marginally increases the surgical time and decreases sensory deficits of the

patient. Increasing awareness to preservation of intercostobrachial nerve further intensifies the need to know the variation related to intercostobrachial nerve and medial cord during axillary surgery.³ In previous literature, some extrathoracic communications were also observed in 86% of specimens. These contributions occurred variably from either the intercostobrachial nerve or one of its branches communicated with the medial cord (35.6%), medial cutaneous nerve of forearm (25.5%), or posterior cutaneous nerve of forearm (24%).⁶ During intravenous regional anaesthesia, the intercostobrachial nerve is used for neural blockade due to its superficial location to decrease the tourniquet pain.⁷ Furthermore, surgeons should take precautions while performing operations like transaxillary mammary augmentation in the region of second intercostal to avoid injury to the intercostobrachial nerve.⁸ The variations of the intercostobrachial nerve and medial cord of brachial plexus should be kept in view while performing surgical exploration of the axilla and arm region to avoid damage to these important nerves. We as anatomists, humbly submit awareness of neural variations as encountered in the present investigation is of tremendous significance to surgeons in their clinical practice.

CONCLUSION

The interpretation of the anomaly of the intercostobrachial nerve and cords of brachial plexus requires consideration of the development and innervation of upper limb musculature. Precise knowledge of the course and disposition of intercostal nerves and the branches of brachial plexus is of paramount significance for surgeons while performing operations on axillary region.

REFERENCES

1. Williams PL, Bannister LH, Berry MM, Collins P, Dyson M, Dussek JE, Ferguson, M.W.J.: Gray's Anatomy In : Nervous system. 38th Edn; Churchill Livingstone. Edinburgh. pp 1266-1274 (1995).
2. Cunnick GH, Upponi S, Wishart GC. Anatomical variants of the intercostobrachial nerve encountered during axillary dissection. *Breast* 2001;10: 160-162.
3. Freeman SR, Washington SJ, Pritchard T, Barr L, Baildam AD, Bundred NJ. Long term results of a randomized prospective

- study of preservation of the intercostobrachial nerve. *European Journal of Surgical Oncology* 2003;29: 213–215.
4. Baker RJ, Fischer JE (eds) (2001) Segmental mastectomy and axillary dissection. In: *Mastery of surgery*. Vol 1/4th Ed. Lippincott, Williams and Wilkins, Philadelphia, pp. 591–593.
 5. Loukas M, Joanna Grabska J, Tubbs RS, Louis RG. An unusual union of the intercostobrachial nerve and the medial pectoral nerve. *Folia Morphol* 2007;66(4):356–359.
 6. Loukas M, Noordeh N, Tubbs RS, Jordan R. Variation of the axillary arch muscle with multiple insertions. *Sing Med J*. 2009;50(2):88–90
 7. O'Rourke MG, Tang TS, Allison SI, Wood W. The anatomy of the extrathoracic intercostobrachial nerve. *Aust N Z J Surg* 1999;69:860-4.
 8. Hwang K, Huan F, Hwang SW, Kim SH, Han SH. The course of the intercostobrachial nerve in the axillary region and as it is related to transaxillary breast augmentation. *Ann Plast Surg* 2014;72(3):337-9.

Source of support: Nil

Conflict of interest: None declared