

Introduction

Currently, there are multiple treatment options for breast cancer including chemo- and radiotherapy. When these treatment options do not work, a radical mastectomy may be considered. This procedure includes an axillary lymph node dissection. Such dissection represents a risk to the intercostobrachial nerve (ICBN). Originating from the T2 spinal level, the ICBN is a lateral cutaneous branch of the second intercostal nerve.

The intercostobrachial nerve (ICBN) is a large cutaneous branch that provides sensation around the axilla, medial arm, and upper lateral chest. After traversing the intercostal and serratus anterior muscles, it enters the axilla and arm until reaching the skin and subcutaneous tissue.¹

The anatomical knowledge of ICBN origin and its anatomical variability is significant in axillary lymph node dissection for breast cancer or any other procedure that involves the axillary region. Lesions of the ICBN have been associated to postoperative pain, paresthesia, and loss of sensation in the dermatome supplied by this nerve.² Thus, surgical preservation of the ICBN is an important aspect of axillary region procedures.

Case Report

During routine axillary dissection, two cadavers were encountered with intercostobrachial nerve (ICBN) variations. The variations found involved the origin of the ICBN in two cadavers. The first cadaver, Donation A (Fig. 1), has an ICBN with a bifurcation that arises from the second and third intercostal spaces before merging. The second cadaver, Donation B (Fig. 2A), has a trifurcation exiting the first, second, and third intercostal spaces. The nerve shown is the ICBN arising from the 2nd, 3rd and 4th intercostal space. The schematic representation shows the pectoralis major and pectoralis minor reflected to better visualize the course of the ICBN. The mammary gland is shown to understand the risk at which the ICBN may be during breast surgery (Fig. 2B). Usually, the ICBN arises only from one intercostal space mostly at the level of T2. Nonetheless, both nerves maintain their common route towards the brachial plexus of the upper arm.

Methods

Preparation and preservation of cadaver in 10% formalin.

Axillary region dissection following Grant's guidelines.

Discovery of ICBN anatomical variations.



Figure 1. Anatomical variation shows an axillary and arm dissection of a bifurcation (1 and 2) LCB (2nd ICBN) 1st ICBN – lateral cutaneous branch of (second intercostal nerve) first intercostobrachial nerve.

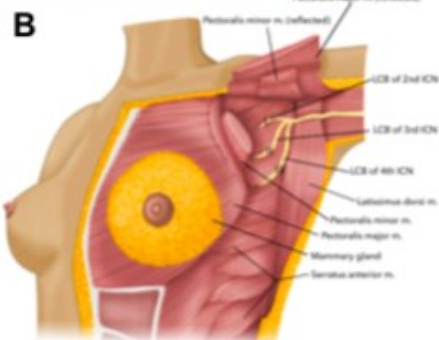
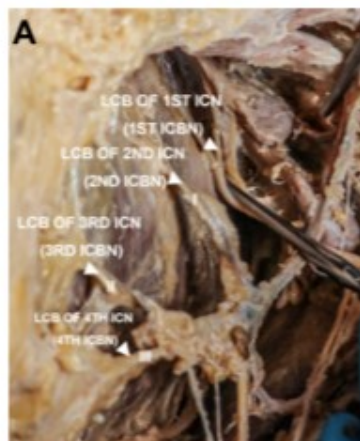


Figure 2 (A) Diagram shows an axillary and arm dissection of a trifurcation (I, II, III)

Discussion

Previous studies have established a high variability in the anatomy of this nerve.^{2,3,4} For instance, Cunnick et al. reported a variation in which the ICBN arose from the T2 spinal level and bifurcated into a main and a smaller trunk.³ Another variant established an ICBN formed by the junction of one branch arising from the T1 spinal level and another from the T2 level.³ Literature also reports ICBN variations in which it communicates with the brachial plexus via the medial brachial cutaneous nerve and the medial cord.² Of note, van Tonder et al. described two cases in which the ICBN presented a motor branch for the pectoral muscles.⁴ An embryological process could be underlying such variations. The neural crest cells migrate from the dorsum of the neural tube via epithelial to mesenchymal transition, eventually, giving rise to multiple structures including peripheral nerves (e.g., ICBN).

The ICBN traverses the axilla, and it is regularly encountered by surgeons during breast cancer surgical procedures, including radical mastectomies. Studies have demonstrated that patients who have the ICBN preserved refer less postoperative pain, or paresthesia, or loss of sensation in the armpit and inner arm when compared to patients who underwent ICBN injury or sectioning.^{5,7} As a result, surgeons should be aware of the high anatomical variability that the ICBN presents and work with caution when performing such axillary region procedures.

Conclusion

The variability of the ICBN is well documented; during this study, we report two distinct variations on two cadavers. During axillary surgical procedures for breast cancer the ICBN may be sectioned or injured which would potentially lead to postoperative pain, paresthesia, and sensory loss. The most effective way to prevent nerve injury is by identifying it during surgery. Thus, reporting such ICBN variations allows surgeons to work more cautiously during these procedures increasing the chance of ICBN preservation. Hence, leading to improved postoperative quality of life.

References

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