Case report

Variations of the Intercostobrachial Nerve- a series of case reports

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Abstract:
The intercostobrachial nerve is the lateral cutaneous branch of the second intercostal nerve. The following series of case reports presents variations of the intercostobrachial nerve found during dissection of two formalin fixed cadavers. The knowledge of intercostobrachial nerve and its variations is essential for surgeries of the thoracic wall and axilla such as modified radical mastectomy.

Keywords: Intercostobrachial nerve, Modified radical mastectomy, Post mastectomy pain syndrome

Introduction:
The lateral cutaneous branch of intercostal nerves divides into an anterior and posterior branch. However, the second intercostal nerve does not divide like the other nerves and this undivided lateral cutaneous branch of the second intercostal nerve is called as the Intercostobrachial nerve. The intercostobrachial nerve pierces the intercostalisexternus and serratus anterior, crosses the axilla to reach the medial side of the arm and communicates with a branch from the medial brachial cutaneous nerve. The intercostobrachial nerve then pierces the fascia and supplies the skin of the upper half of the medial and posterior part of the arm, communicating with the posterior brachial cutaneous branch of the radial nerve.
The intercostobrachial can also be a cause of referred cardiac pain. Injury to the intercostobrachial nerve during radical mastectomy is one of the commonest causes of post mastectomy pain syndrome.

Case report:
During routine dissection in two male cadavers, around 50 years old we found out the following variation. After removing the skin, the intercostobrachial nerve was identified in the second intercostal space superficially.
The nerve was traced till the postero-medial aspect of the upper arm.
Case 1 b) PMA-Pectoralis Major, PMI-Pectoralis Minor, SA-Serratus Anterior, ICBN-Intercostobrachial nerve, S-Superior I-Inferior, M-Medial, L-Lateral
Case 1 b) ICBN-Intercostobrachial nerve, SB- Short branch, LB- Long branch
Case 2.ICBN-Intercostobrachial nerve, PMA-Pectoralis major, PMI-Pectoralis Minor, M-Medial, L-Lateral, S-Superior, I-Inferior

Discussion:
Cunnick et al. described the anatomy of the intercostobrachial nerve as highly variable [1]. Hegrouped it into the six variations. The following are the anatomical variations of intercostobrachial nerve observed during surgery[1].
• Type 1 – arises from T2 alone and does not give off any branches.
• Type 2 – arises from T2 alone and divides into a large main trunk and a much smaller branch.
• Type 3 – arises T2 alone and divides equally into two branches
• Type 4 – formed by two equal-sized branches from T1 and T2 nerves. No significant branches during its course through the axilla.
• Type 5 – arises from two separate T2 radicals to form a single nerve which does not give off branches in the axilla.
• Type 6 – arises from T2 alone and divides into a large main trunk and at least two smaller branches.

According to the above classification, in the present study; Case 1 a does not belong to any of the variations mentioned in the classification. Case 1 b represents type 2 variation. Case 2 represents type 3 variation.

Satyajeet V et al conducted a retrospective study in 2007, in 42 breast cancer patients with the mean age group of 51-53 years [2]. According to the above classification: Type 2 variation was 19.4% and Type 3 variation was only 4.7%

In Modified Radical Mastectomy and Axillary clearance of lymph nodes, the nerve may be sacrificed by the surgeons as an iatrogenic error. In some cases, where the medial cutaneous nerve of arm is absent, the intercostobrachial nerve substitutes the medial cutaneous nerve of arm. In such instances if ICBN is cut the patient will suffer from complete loss of sensation over the medial side of the arm.

Paredes et al. found that patients who underwent Modified Radical Mastectomy where the intercostobrachial nerve was sectioned near the chest wall, presented commonly with paresthesia rather than pain [3].

Assa J et al. noted that the preservation of the intercostobrachial nerve during radical mastectomy as a treatment for breast cancer was beneficial. Patients in whom the said nerve was preserved were free from throbbing and paraesthesia sensations [4].

**Conclusion:**

It is essential to keep in mind the normal course of the intercostobrachial nerve along with its variations, in order to avoid misdiagnosis and iatrogenic complications during surgeries related to that particular area.

**Figure 1:** Depicting Case (1a); PMA- Pectoralis Major, PMI- Pectoralis Minor, DL- Deltoid, SA- Serratus Anterior, ICBN- Intercostobrachial nerve, M- Medial, L- Lateral

**Figure 2:** Depicting Case (1b); PMA- Pectoralis Major, PMI- Pectoralis Minor, SA- Serratus Anterior, ICBN- Intercostobrachial nerve, S- Superior, I- Inferior, M- Medial, L- Lateral

**Figure 3:** Depicting Case (1b); ICBN- Intercostobrachial nerve, SB- Short branch, LB- Long branch
Figure 4: Depicting Case 2; ICBN- Intercostobrachial nerve, PMA- Pectoralis Major, PMI- Pectoralis Minor, M- Medial, L- Lateral, S- Superior, I- Inferior

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