International Journal of scientific research and management (IJSRM)
||Volume||2||Issue||11||Pages||1661-1665||2014||
Website: www.ijsrm.in ISSN (e): 2321-3418

Superficial Branch of Radial Nerve in Fetuses

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ABSTRACT

Despite a careful approach by majority of the surgeons, damage to these branches may occur inadvertently, leading to paraesthesia, hypesthesia, and painful neuromas. The aim of this study was to demonstrate anatomic variations of the superficial branch of the radial nerve (SBRN) and to discuss the importance of this branch for neonatal surgical approaches. 30 spontaneously aborted fetuses (21 males, 9 females; age between 24 and 36 weeks) were dissected. In 56.7% of the cases, SBRN emerged from beneath the brachioradialis muscle at level of lower one third of forearm, while in rest of the cases, it emerged at the level of lower one third of forearm. it was observed to be penetrating beneath he SBRN became subcutaneous at level of lower one third of forearm in 70% of the cases, while in rest of the cases, it was at level of lower one third. This distance was found to vary from6.33 to 11.45 mm.Branches of the SBRN which are close to the first dorsal compartment may be injured while releasing the compartment. For this reason, during this operation, attention should be paid to the existence of the SBRN branches, especially in the first dorsal compartment.

Key words: radial, fetuses, fascia, branch, superficial

INTRODUCTION

Duringpaediatric hand surgeries, utmost care must be taken not to damage the sensory branches of radial nerve which run across the area towards the dorsum of the hand. Study of course and variations of superficial branch of radial nerve (SBRN) in foetuses is important these days (1). Despite a careful approach by majority of the surgeons, damage to these branches may occur inadvertently during various surgeries on pediatric patients. Paraesthesia, hypesthesia, and painful neuromas may result due to excessive retraction, partial or complete transection of nerve (2). Knowledge of distribution of SBRN in forearm and dorsum of hand can be useful to prevent any kind of injury to this nerve during various procedures in newborns. The aim of this study was to demonstrate anatomic variations of SBRN

and to discuss the importance of this branch for neonatal surgical approaches. In foetuses, study of SBRN becomes very important for academic purposes also so as to see if there is any difference in the course of SBRN in fetuses and adults. In our knowledge, till date available literature on SBRN in fetuses is sparse.

MATERIAL AND METHODS

After getting approval from Institutional ethical committee and informed parental consent, 30 spontaneously aborted fetuses (21 males, 9 females; age between 24 and 36 weeks) were obtained from the department of Obstetrics and Gynaecology, PGIMER, Chandigarh. These fetuses were preserved in 10% formalin. Dissection of upper extremity was performed under 2.5 loupe magnification. SBRN was identified in the distal forearm regionon the lateral aspect, and was dissected upto distal part of dorsum of digits. In this study, we observed various parameters related to SBRN. On the basis of length of forearm extending from lateral epicondyle to the styloid process, it was divided into three parts – upper one third, middle one third and lower one third. Then we observed the level of emergence of SBRN from deep fascia, level of emergence from under the brachioradialis and level of branching.

RESULTS

Mean length of forearm was observed to be 45.3 ± 4.2 mm. In 56.7% of the cases, SBRN emerged from beneath the brachioradialis muscle at level of lower one third of forearm, while in rest of the cases, it emerged at the level of lower one third of forearm (Figure 1). The SBRN penetrated the fascia between brachioradialisand extensor carpi radialislongus (ECRL) at a mean distance of 13.5± 2.6 mm proximal to the styloid process.

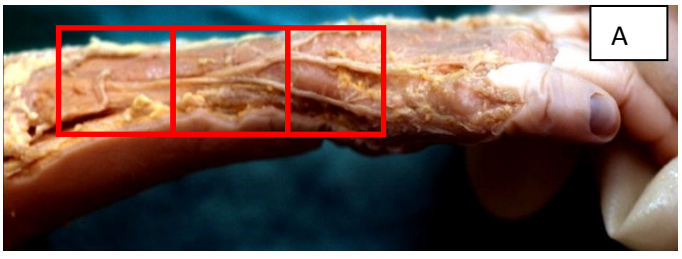

Figure 1 Figure showing level of emergence of SBRN beneath brachioradialis at the level of (A) middle 1/3rd, while (B) lower 1/3rd Thus, it was observed to be penetrating beneath the SBRN became subcutaneous at level of lower one third of forearm in 70% of the cases, while in rest of the cases, it was at level of lower one third. This distance was found to vary from6.33 to 11.45 mm.

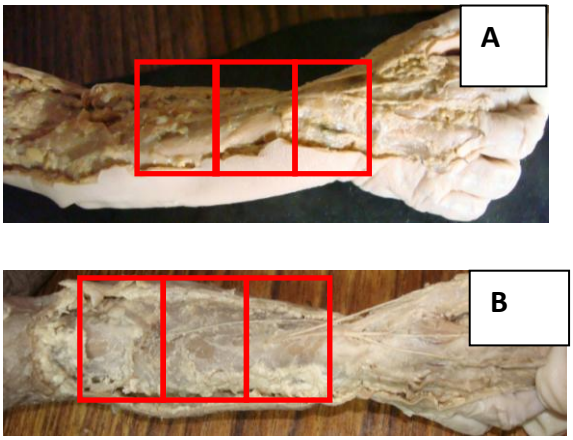

Figure 2 Figure showing level of emergence of SBRN from deep fascia at the level of (A) middle 1/3rd (B) lower 1/3rd

The level of branching of SBRN was 6.55 ±0.98 mm proximal to styloid process. In 90% cases, branching of SBRN into SR1, SR2 ans SR3, branches respectively took place at the level of lower one third of forearm in 90% of the cases. The distance of the closest branch of SBRN to the center of the first dorsal compartment was 2.23mm.

DISCUSSION

It should be very helpful to know the anatomic characteristics of the SBRN, especially for hand surgeons, to minimize the risk of injury of the SBRN during surgical approaches.The skin of the hand is normally innervated by the terminal cutaneous branches of the median, ulnar, and radial nerves of the brachial plexus. On the dorsal surface the radial nerve supplies the skin of the radial two and one-half digits, with the exception of their distal parts which are supplied by the median nerve, a nerve on the volar surface and, in addition, it supplies the radial half of the dorsal surface of the hand (3).In an earlier study, out of twenty cases, two cases (10%) SBRN became subcutaneous by piercing the tendon of brachioradialis (4) whereas another study reported that only in 2% cases SBRN passed through split tendon of brachioradialis (5)Although the

distribution of the SBRN has been described in anatomic textbooks, the characteristics of its pathway which are related to its clinical importance have not been clearly demonstrated in fetuses (4, 6). Branches of the SBRN which are close to the first dorsal compartment may be injured while releasing the compartment. For this reason, during this operation, attentionshould be paid to the existence of the SBRN branches, especially in the first dorsal compartment (6-8).

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