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Research Article

A case study of musculocutaneous nerve variations

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ABSTRACT

Background: Musculocutaneous nerve variations may become evident clinically or may be encountered during surgery. These are of importance for neurologists, traumatologists and orthopaedicians.
Methods: 70 upper limbs from 35 embalmed cadavers were studied during the study period of 2 years during routine dissection in the Department of Anatomy S.M.S. Medical College, Jaipur, India.
Results: A branch from musculocutaneous nerve arising at a distance of 6 cm from acromion process of scapula.
A branch arising from median nerve at a distance of 14.4 cm from acromion process and joins with the branch of musculocutaneous nerve at around 17.4 cms away from the acromion process. The nerve thus formed by the union of the branches from median and musculocutaneous nerves further goes and joins the Radial nerve just before entering the cubital fossa.
Conclusions: While performing shoulder surgery, the palpation of musculocutaneous nerve is of great importance, as it may get injured by the retractors which are placed under the coracoid process during the surgery. Frequent shoulder dislocation, coracoid process grafting and arthroscopy might damage the nerve as well as the muscle. This article might fulfil the gap in the original research work in this field.

Keywords: Anatomy, Musculocutaneous nerve, Brachial plexus.

INTRODUCTION

Variations in the formation of brachial plexus and its terminal branches in the upper extremity are quite common and have been reported in many literatures.[1] In about 65.3% of the population these variations were noticed.[2] The musculocutaneous nerve arises from the lateral cord of brachial plexus having root value C5,6,7 opposite the lower border of pectoralis minor muscle. Then it pierces the coracobrachialis and descends laterally between biceps and brachialis to the lateral side of the arm. Just below the elbow it pierces the deep fascia lateral to the tendon of biceps, and continues as the lateral cutaneous nerve of the forearm. It supplies coracobrachialis, both the heads of biceps and most of brachialis (lateral most slip of brachialis is supplied by the radial nerve). The branch to coracobrachialis is given off before the nerve enters the muscle: its fibres are from the seventh cervical ramus and may branch directly from the lateral cord. After piercing the coracobrachialis it then supplies biceps and the brachialis, the branch to brachialis also supplies the elbow joint. It gives a small branch to the humerus, which enters the shaft with the nutrient artery.[3] Such variations may become evident clinically or may be encountered during surgery. These are of importance for neurologists, traumatologists and orthopaedicians. So a detailed study on musculocutaneous nerve was conducted in the Department of Anatomy.

METHODS

70 upper limbs from 35 embalmed cadavers were studied during the study period of 2 years during routine

dissection in the Department of Anatomy S.M.S. Medical College, Jaipur, India. Full course of musculocutaneous nerve was examined and variation was found in one of the upper limbs of an adult male cadaver.

RESULTS

A branch from musculocutaneous nerve arising at a distance of 6 cm from acromion process of scapula. A branch arising from median nerve at a distance of 14.4 cm from acromion process and joins with the branch of musculocutaneous nerve at around 17.4 cms away from the acromion process. The nerve thus formed by the union of the branches from median and musculocutaneous nerves further goes and joins the Radial nerve just before entering the cubital fossa.

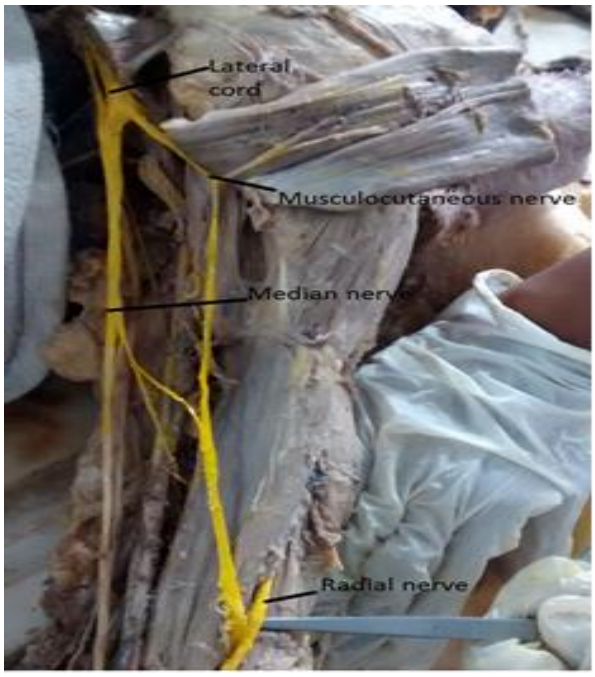

Figure 1: Presenting musculocutaneous nerve arising from lateral cord, a branch from median nerve joining the musculocutaneous nerve and the nerve trunk thus formed joins with the radial nerve.

DISCUSSION

In the year 1998 and Venierators and Anangnostopoulou classified in relation to the muscle coracobrachialis.

Type 1: The communication is proximal to coracobrachialis.

Type 2: The communication is distal to coracobrachialis.

Type 3: The branches and the nerve itself are not seen to pierce the coracobrachialis.

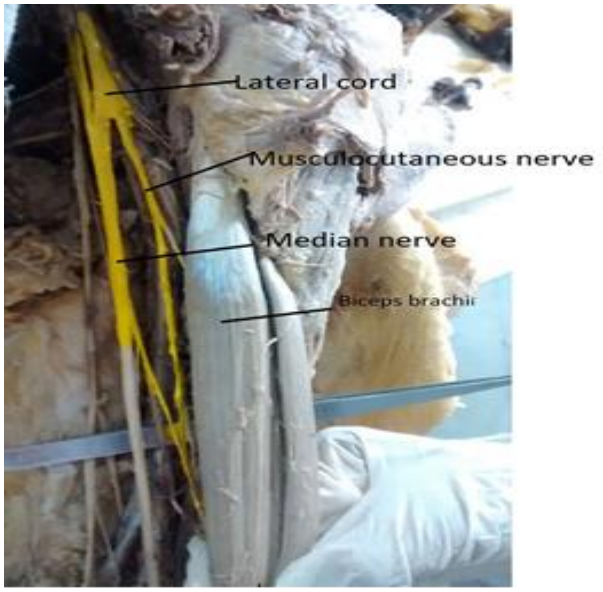

Figure 2: Presenting musculocutaneous nerve supplying biceps brachii and further unites with a branch from median nerve.

Our present study falls under the type 2.

The variation in the branching pattern of musculocutaneous and median nerve has been described widely. Le Minor in the year 1992 classified these variations in 5 types:

Type 1: There is no communication between median and the musculocutaneous nerve.

Type 2: Fibres from the median root of median nerve pass through the musculocutaneous nerve which further joins the median nerve in the middle of arm.

Type 3: Fibres from the lateral root of median nerve pass through the musculocutaneous nerve and this after travelling some distance forms the lateral root of median nerve.

Type 4: The lateral root of median nerve is joined by the fibres from the musculocutaneous nerve and thus after travelling some distance the musculocutaneous nerve arises from median nerve.

Type 5: The musculocutaneous nerve is completely absent and thus the nerve passes through the lateral root of median nerve and the fibres of musculocutaneous supplying the muscle are seen to be branching out from median nerve. Here, the coracobrachialis is not pierced by the musculocutaneous nerve.

In our study we found that some fibres of the musculocutaneous nerve sends muscular supply and some fibres join the fibres from median nerve and later these join the radial nerve in the cubital fossa.

The variation in our current study might be a result of developmental anomaly. During embryonic life, many factors influence the development of peripheral nerves and the muscles of the limb. The muscles of the forelimb, during the 5th week of intrauterine life develop from the mesenchymal cells of the paraxial mesoderm by the expression of 5 HoxD genes.

The brachial plexus is formed by the growth cones from the motor axons. These growth cones reach the base of the limb buds and after forming the brachial plexus further continue into limb bud.[9]

Many chemoattractants and chemorepulsants come into play and guide the developing axons in a highly co-ordinated manner. Tropic substances like c-kit ligand, neutrin-1, and brain derived neurotropic growth factor, neutrin-2 help in supporting and guiding the growth cones towards the right direction. Thus alteration in the signals might result in the variations seen in the nerves.

CONCLUSION

While performing shoulder surgery, the palpation of musculocutaneous nerve is of great importance, as it may get injured by the retractors which are placed under the coracoid process during the surgery. Frequent shoulder dislocation, coracoid process grafting and arthroscopy might damage the nerve as well as the muscle. This article might fulfill the gap in the original research work in this field.

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REFERENCES

1. Kerr AT. The brachial plexus of nerves in man, the variations in its formation and branches. AMJ Anat. 1918;23:285-395.
2. Jamuna M. and Amudha G., A Cadaveric Study on the Anatomic Variations of the Musculocutaneous Nerve.
3. Brachial plexus. Susan Standring. Gray's Anatomy The Anatomical Basis of Clinical Practice. 40th ed. Spain : Elsevier. 2008.
4. Buch – Hansen K. Uber Varietaten des Nervus Musculocutaneous und deren Beziehungen. Anat Anz. 1955;102:187-203.
5. BA MORGAN, TABIN C. HOX GENES AND GROWTH: early and late roles in limb bud morphogenesis. Dev Suppl. 1994;10:181-6.
6. Moore KL, Persaud TV. The musculoskeletal system. 7th ed. Philadelphia: Saunders Elsevier; 2003;9:181-6.
7. Larson WJ. Development of peripheral nervous system.3rd ed. Pennsylvania: Churchill Livingstone; Human embryology. 2001:115-6.
8. Flatow EL, Bigliani LU, April EW (1989). An anatomic study of the musculocutaneous nerve and its relationship with the coracoid process. Clin Orthop Relat Res. 244:166-71.

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