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ANATOMICAL VARIATIONS IN INNERVATION OF OBTURATOR NERVE AND ITS CLINICAL SIGNIFICANCE

Anatomy

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ABSTRACT

INTRODUCTION: It has been stated that chronic pain in the distribution of Obturator nerve is a difficult diagnostic challenge.This pain may be explained by the the many potential causes and numerous anatomical structures in the groin area that may be susceptible to injury or disease. These pathologies include adductor muscle strain, stress fractures and entrapment of peripheral nerves.5-12.

AIM AND OBJECTIVES: This study was conducted to provide a thorough description of variability in the obturator nerve branching pattern in inguinal region.

MATERIAL AND METHODS: The study was conducted on 22(18 male, 4 female), formalin fixed human cadavers available in department of Anatomy, Osmania Medical College, Koti, Hyderabad.

RESULTS : Most commonly the anterior branch divided into three major muscular branches that innervated Adductor longus, Adductor brevis and Gracilis. The posterior branch predominantly separated into two branches that innervated Adductor brevis and Adductor part of Adductor magnus (96.2%). In one case the posterior division of Obturator nerve was supplying Gracilis muscle(4.8%). The point of division of Obturator nerve into anterior and posterior branches was in the thigh (80.24%), Intrapelvic (20.6%). The articular branch of obturator nerve showed different branching patterns, which frequently arose from common obturator nerve.

CONCLUSION: High anatomical variability in Obturator nerve's divisons and subdivisons does exist, and explains the difficulty frequently encountered in application of regional anesthetic techniques.

KEYWORDS

Obturator nerve, Adductor brevis, Adductor magnus, Gracilis, Divisons.

1. INTRODUCTION:

Obturator nerve is branch of lumbar plexus, and is formed by ventral branches of ventral rami of L2, L3 and L4 spinal nerves. It is a nerve of adductor compartment and lies within psoas major at its formation. The nerve descends through the fibers of psoas major muscle and emerges from its medial border. The obturator nerve runs along the lateral wall of lesser pelvis ,above and infront of obturator vessels ,to the upper part of obturator foramen. Passing through the obturator canal, the nerve extends to the thigh .During this course the nerve divides into anterior and posterior branches. After a short course in the inguinal region , the anterior branch of obturator nerve runs between adductor longus and adductor brevis muscles. In contrast, the posterior branch runs between adductor magnus and adductor brevis muscles. During this course the nerves provide the branches that innervate the above mentioned muscles.

Obturator nerve block is not routinely performed because nerve localization and clinical evaluation of nerve block success can be difficult and time consuming. One possible reason for these complications is high anatomic variability that the nerve demonstrates at the level of inguinal region.

Therefore , this study was conducted to provide description of variability in obturator nerve branching pattern and its potential usefulness in regional anesthetic technique.

2. MATERIAL AND METHODS :

Twenty two (eighteen male and four female) adult (aged between 30-70yrs) formalin fixed human cadavers used for undergraduate dissection from Department of Anatomy, Osmania Medical College. There were no signs of surgery, wound scars, or trauma in the thigh region of any of the cadaver.

The obturator nerve anatomy was examined bilaterally and variations in its branching pattern was recorded .After removal of the skin and subcutaneous tissues of the anterior and medial thigh, the Sartorius , pectineus, and adductor longus muscles were dissected free from the anterior fascias. With great care , the pectineus and adductor longus muscles were dissected at their fascial septum and were incised in transverse pattern to expose the adductor brevis .

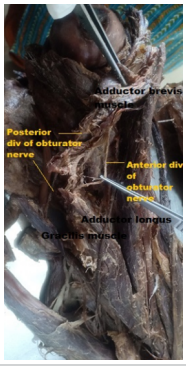
The anterior branch of obturator nerve was identified with in the connective tissue covering the adductor brevis muscle. The course of posterior branch of obturator nerve was exposed after dissection and antero- lateral removal of adductor brevis muscle. Both branches of obturator nerve were followed cranially and caudally and were carefully dissected from the surrounding tissue.

3. RESULTS:

In the present study, in 18 cases (80.4%),the division of oburator nerve into anterior and posterior division was in the thigh. In 4 cases (20.6%),the division was intapelvic.

The anterior division of the obturator nerve divided into three major branches that innervated Adductor longus, Adductor brevis and Gracilis muscle in 21 cases(95.4%),

in one case the Gracilis muscle was innervated by posterior division of obturator nerve (4.6%).The posterior division of Obturator nerve divided into two branches innervating Adductor part of Adductor magnus and Adductor brevis (if not supplied by anterior division).



4. DISCUSSION:

The results of the present anatomic study clearly demonstrate that the branching pattern of the obturator nerve is highly variable. Therefore, examination of the anatomic variability of the obturator nerve may explain some of the difficulties experienced when locating and blocking the obturator nerve either with neurostimulation or with ultrasound-guided techniques.

So far, it has been suggested that a femoral nerve block supplemented with an obturator nerve block provides a better quality of postoperative analgesia following total knee replacement. The combination of an obturator nerve block with a femoral and sciatic nerve block has also been shown to be beneficial to patients recovering from a major knee surgery. Further clincal applications of an obturator nerve block include prevention of the obturator reflex during transurethral bladder tumor resections,releif of thigh adductor spasms in patients suffering from multiple sclerosis or paraplegia and treatment of chronic hip pain. Moreover, the anterior and posterior branches exhibit multiple branching patterns, which were widely distributed among the adductor muscles. Therefore, even though muscular contractions may be observed in one of these muscles with the neurostimulation technique, it is possible that this response may be due to stimulation of a subdivision, and not to the obturator nerves main branch. Thus,injection of local anesthetics at this block will lead to unsuccessful block.

5.CONCLUSION:

In this study, the attempt is to add on more details on innervation of obturator nerve and its branching pattern so as to aid local anesthetic techniques.

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