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Original Research Paper

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UNILATERAL HIGH DIVISION OF SCIATIC NERVE - A CASE REPORT

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ABSTRACT The Sciatic nerve is the widest nerve of the body, consists of two components namely tibial and common peroneal components, derived from the lumbosacral plexus from the ventral rami of L4 to S3 spinal nerves. The Sciatic nerve usually enters the gluteal region under the piriformis muscle. The purpose of this study is to identify the variations in the division pattern of sciatic nerve. This high division of the sciatic nerve may result in nerve injury during deep intramuscular injections in gluteal region, piriformis syndrome due to compression of the nerve, failed Sciatic Nerve block in anesthesia and surgical complications.

KEYWORDS : Sciatic nerve , Variation , Piriformis

INTRODUCTION

Sciatic is a Greek word derived from "Ischiadichus" and hence it is called as ischiadic nerve. Sciatic nerve (SN) is the thickest nerve in the human body. Normally it reaches the gluteal region from the fossa by passing below the piriformis muscle and divides into tibial and the common fibular (peroneal) nerves at the lower part of the posterior compartment of the thigh[1].The point of division of the sciatic nerve into tibial and common fibular components is very much variable. The common site is at the junction of the middle third and lower third of the back of the thigh, near the apex of the popliteal fossa. Dorsal divisions of ventral rami of L4-5, S1-2 form the common peroneal component and the ventral divisions of ventral rami of L4-5, S1-3 form the tibial component of the sciatic nerve. The piriformis is a flat muscle, pyramidal in shape, lying almost parallel to the posterior margin of the gluteus medius. It arises from the front of the sacrum by three fleshy digitations. A few fibers also arise from the margin of the greater sciatic foramen and from the anterior surface of the sacrotuberous ligament. The muscle comes out of the pelvis through the greater sciatic foramen and is inserted by arounded tendon to the upper border of the greater trochanter[2] Piriformis syndrome is caused by an entrapment of the sciatic nerve as it exits the greater sciatic notch in the gluteal region[3]. The high division of SN may lead to compression of nerve and piriformis syndrome along with complications during intramuscular injection, anaesthesia or surgery in the gluteal region[4].

Case report

During routine dissection in Department of Sharir Rachana, Jammu institute of ayurveda and research, Nardani, Jammu it was observed that in the right sided gluteal region the sciatic nerve pierced the piriformis muscle dividing it into superior and inferior slips. Then after a short distance the sciatic nerve bifurcated into tibial and common peroneal nerves (in the gluteal region). These two nerves descended to the back of the thigh then and to the back of the leg (Figure 1 & 2).

Fig. 1 Showing A- sciatic nerve, B- piriformis muscle, C- Tibial nerve D- common peroneal nerve

Fig. 2 Showing A- piriformis muscle B-Tibial nerve C– Common peroneal nerve

But on the left side the sciatic nerve divided into tibial and common peroneal nerves at the junction of the middle third and lower third of the back of the thigh (near the apex of the popliteal fossa) as usual common peroneal nerves.

DISCUSSION

In a case presented by Paval et al in 2008, high division of the sciatic nerve was found bilaterally in a 70 year old male cadaver. Common peroneal nerve pierced the piriformis dividing the muscle into upper and lower slips whereas the tibial nerve emerged below the lower slip of the piriformis [5]. Khan et al (2011) found a case where on the left side common peroneal nerve passed between the two divisions of piriformis and tibial nerve passed below the inferior piriformis[6].

Unilateral double gluteus maximus and double piriformis with high division of sciatic nerve were reported by Kirici et al (1999) . In that case the common peroneal nerve passed between the two parts of piriformis and the tibial nerve emerged under the lower border of inferior piriformis[7] .

In 2013, Bhattacharya et al presented a case with double piriformis and division of the sciatic nerve in the pelvis; the common peroneal nerve emerged between the two piriformis muscles, whereas the tibial nerve emerged below the lower piriformis on the left side. On the right side sciatic nerve divided in the gluteal region after emerging from the lower border of piriformis like the present case[8] .

Smoll found that the prevalence of high division of sciatic nerve in cadavers was 16.9% and in surgical case series was 16.2%[9]. This high division of the sciatic nerve may result in nerve injury during deep intramuscular injections in the gluteal region, sciatica, piriformis syndrome, failed SN block in anesthesia or incomplete block of SN during popliteal block anesthesia, injury during posteriorhip operations and other surgery in the gluteal region[10]. In piriformis syndrome, the sciatic nerve can be entrapped between the gemellus superior and piriformis muscles [11].Another common site of

entrapment is when the sciatic nerve or one of its branches pierces the piriformis muscle, and this can occur in about 1% to 5% of all humans [12,13]. In that case myospasm and or contraction of the piriformis muscle itself can lead to pain along the back of the thigh to the knee, loss of sensation or numbness and tingling into the leg and sole of the foot. This particular syndrome can often mimic its more notorious counterpart known as sciatica. Piriformis syndrome is often misdiagnosed as sciatica due to similar symptoms [14]. The main difference between sciatica and piriformis syndrome is in the cause. Sciatica is directly due to a lumbar disc pressing on the sciatic nerve as it exits the intervertebral foramen in the lumbar spine [15]. Some workers consider piriformis syndrome to be a form of myofascial pain syndrome [16]. A history of trauma may be present in approximately 50% of cases of the syndrome. The trauma is not usually sudden in onset and may occur several months before the initial symptoms. It may also follow total hip replacement surgery. Complete medical history and physical examination are necessary for differential diagnosis of this syndrome[17]. The management of piriformis syndrome includes analgesic, muscle relaxants, injection of local anesthetic agents, steroid (like methyl prednisolone) or botulinum toxin into the piriformis muscle; steroid and liquid anaesthetic agents can be injected to the area of sciatic nerve even[18] . To avoid blind injection in the gluteal region, the use of electromyography or computed tomography (CT) will be helpful to identify the piriformis muscle and a nerve stimulator can be used for sciatic nerve identification[19] . Anatomical landmarks and fluoroscopic guidance may also be useful in this regard. Surgery may be considered when the piriformis is involved in the sciatic nerve entrapment. The muscle may be thinned, divided or excised to be compensated with the obturator internus, gemelli, or quadratus femoris muscle, as these muscles share common insertions with the piriformis muscle[20].

CONCLUSION

The anatomical variants associated with division of sciatic nerve must always be borne in mind as they are relatively prevalent and have important clinical implications in anaesthesiology, neurology, sports medicine and surgery.

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