

Unilateral High Division of Sciatic Nerve- A Case Report

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Abstract

Case Report

Sciatic nerve is the thickest and largest nerve of the body arising from the sacral plexus. It begins in the pelvis and divides at the superior angle of popliteal fossa into tibial and common peroneal nerve. Here, we report an anomalous high division of sciatic nerve in the pelvis in a male cadaver during routine anatomical dissection. This condition is referred to as eventration of sciatic nerve, the knowledge of which is important during surgeries in the gluteal region. Variations of nerve are not only of anatomical and embryological interest but also of clinical importance, as these can be the etiological factors in various pathological conditions like piriformis syndrome, sciatica and coccygodynia. This type of variation may lead to failed sciatic nerve block during pain management of sciatica and other lower limb surgeries.

Keywords: Sciatic nerve, Tibial nerve, Common peroneal nerve, Piriformis, Eventration, Sciatica.

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INTRODUCTION

Sciatic is Greek word derived from "Ischiadicus". The sciatic nerve is also known as the ischiadic nerve or ischiatic nerve [1]. It is formed in the pelvis from the ventral rami of the fourth lumbar to third sacral spinal nerves. It is 2 cm wide at its origin and is the thickest nerve in the body. It leaves the pelvis via the greater sciatic foramen below piriformis and descends between the greater trochanter and ischial tuberosity, along the back of the thigh, dividing into tibial and common peroneal nerves at a varying level proximal to the knee. [2]. High division of sciatic nerve, particularly when it divides in the pelvis, can be classified in a number of ways according to its relation with the piriformis muscle. Unilateral or bilateral high division of sciatic nerve has clinical manifestations ranging from sciatica, injury during deep intramuscular injections [3], entrapment neuropathy called piriformis syndrome and failed sciatic nerve block in anaesthesia and injury during posterior hip operations. Knowledge of variations in the point of bifurcation of sciatic nerve plays an important role in clinical practice by surgeons, anaesthetists and radiologists and neurologists.

CASE REPORT

During the routine dissection classes for the undergraduate students in the Department of Anatomy, Punjab Institute of Medical Sciences, Jalandhar, high division of sciatic nerve within the pelvis was observed on the left side in a 60 year old well-embalmed male cadaver. In our case sciatic nerve divided in the pelvis by giving two branches i.e. Tibial and common peroneal nerve. In gluteal region, the tibial nerve passed under the piriformis muscle and common peroneal nerve passed between the two divisions of piriformis muscle (split Piriformis or divided Piriformis). The common peroneal nerve was accompanied by the inferior gluteal nerve which supplied the gluteus maximus muscle. On the right side, the division of the sciatic nerve was normal.

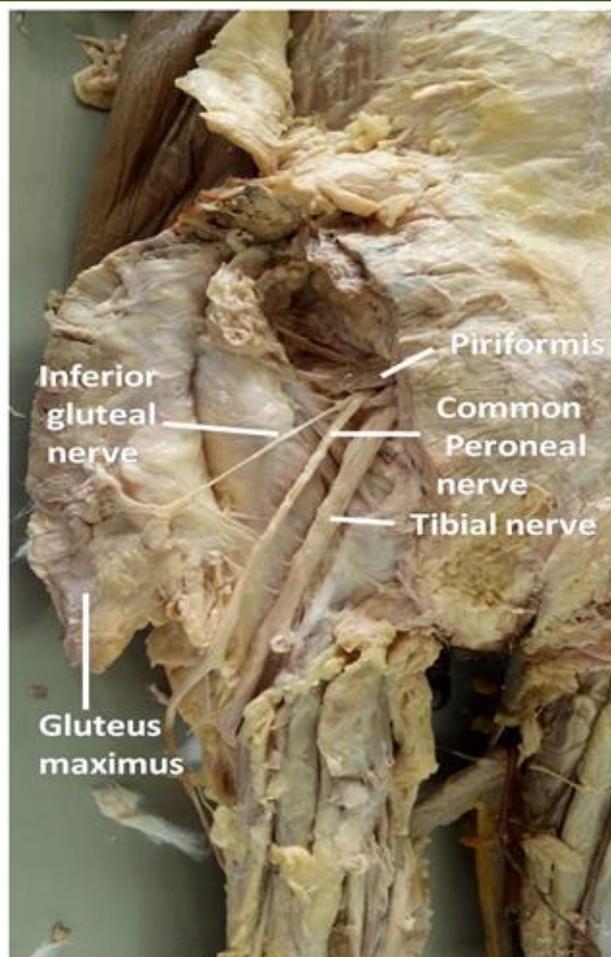


Fig-1: Left gluteal region, showing the branches of sciatic nerve with tibial nerve passing under the inferior border of piriformis muscle and common peroneal nerve passing between the divisions of piriformis muscle

DISCUSSION

Anatomical variations of sciatic nerve can contribute to Piriformis syndrome and sciatica. Classification of high division of sciatic nerve has been attempted by many authors. The best known classification has been given by Beaton and Anson [4] which divides all variations into 6 types. Their study involving 120 cadaveric dissections in 1937, and 240 dissections in 1938 gave the following Beaton & Anson classification:

- Type 1: Undivided nerve below undivided muscle
- Type 2: Division of nerve between and below undivided muscle
- Type 3: Division above and below undivided muscle
- Type 4: Undivided nerve between heads
- Type 5: Division between and above heads
- Type 6: Undivided nerve above undivided muscle

According to Shrivastava *et al.* [5], this type of variation is most likely to be resulted from stochastic process of separation. It may be divided into dorsal and ventral component in early embryonic stage and maintain their identity, although joined together to form

a single trunk by a common connective tissue sheath. These classifications are especially necessary as they help surgeons in assessing cause and site of compression of sciatic nerve and accordingly treatment differs. It is usually seen that when sciatic nerve shows high branching pattern, that one of the branch pierces piriformis. Divided piriformis is said to be a very important cause of piriformis syndrome, as common peroneal nerve passing between two divisions is usually compressed and irritated resulting in the symptoms [6]. A unilateral divided Piriformis is rare as in our case. This diagnosis of unilateral divided piriformis is important as it will solve the dilemma as to why symptoms of piriformis syndrome and consequent sciatica differ on the two sides and will also help the surgeon to plan treatment accordingly. Mustafa Guvencer *et al.* [7] in their study had encountered in 16% of the limbs, the common peroneal nerve piercing piriformis and tibial nerve running below the muscle similar to our case. Machado *et al.* [8] performed a gluteus dissection in 100 fetuses and reported three types of variation, including type 1 where the common peroneal nerve penetrated the piriformis and the tibial nerve passed under the piriformis (16%), type 2 where the common peroneal nerve passed above the piriformis and the tibial nerve passed under the piriformis and type 3 where the sciatic nerve penetrated the piriformis. Ugrenovic *et al.* [9] found high division of the sciatic nerve in 27.5% of the specimens in a cadaveric study performed in 100 fetuses. The incidence of anatomical variation of both sciatic nerve and piriformis is 15-30% [10]. Robinson [11] first coined the term piriformis syndrome.

CONCLUSIONS

Anatomical variations in the gluteal region are very important as this is one of the major areas of surgical manipulations. The long course of makes it vulnerable to nerve injury. Persons administering popliteal block should consider in mind the possibility of a high division of nerve and possibility of block failure due to that. Hence to avoid that, routine imaging of the limb before the procedure should be done in all cases. This knowledge of sciatic nerve variations is also important for nurses and junior doctors while giving deep intramuscular injections. This case discussion emphasizes clinical implications, for the surgeons to practice efficient surgical repair and avoid errors.

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