



Case Report

Bilateral Variation of Divisions of The Sciatic Nerve - A Case Study

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ABSTRACT

Sciatic nerve is the largest nerve of the lower limb, which is formed by lumbo sacral plexus. It is having two components Common peroneal and tibial nerve. Commonly the Sciatic Nerve takes bifurcation at the upper angle of the popliteal fossa. It may variable at different levels. During the routine dissection a significant variation of bifurcation of the sciatic nerve was observed. The bifurcation was within the Pelvic region. The aim of this case study is to provide and define the variation of sciatic nerve bifurcation and its anatomical relation obtained from human cadaver. The dissimilarity in Sciatic nerve bifurcation is very important in surgical and clinical practice.

Keywords: Sciatic Nerve, Common Peroneal nerve, Tibial Nerve.

Introduction

The branches of the lumbo sacral plexus are supplies the buttocks, perineum, and lower limbs. The sciatic nerve is the largest nerve of the body situated in the Gluteal region and is formed by the sacral plexus (L4 to S3 spinal segments). The Sciatic is Greek word derived from "Ischiadichus". It is also called as ischiadic nerve [1] Normally nerve passes from pelvic to gluteal region through greater sciatic foramen leaving the lower border of Piriformis muscle, to enter the gluteal region, deep to the gluteus maximum muscle. Here it lies superficial to other muscles. The tibial and common peroneal nerves bound together by a common sheath of connective tissue to form a sciatic nerve. As it descends through the thigh it sends branches to the posterior compartment of the thigh and leg. The sciatic nerve usually ends half-way down the back of the thigh dividing into common peroneal and tibial nerve. The position of this division of sciatic nerve is variable.

The variation of bifurcation of the sciatic nerve was explained by the different authors. In this particular case, there is a bilateral variation in division of the sciatic nerve was observed. On both the sides the division of sciatic nerve was within the Pelvis [2] & [3].

Case-Study

The observation of variation was done during the routine dissection of gluteal region, for second year anatomy P G students at Alva's Ayurvedic Medical College Moodabidri. The cadaver was 60 year old female body without any deformity and well preserved. With proper incision of the skin, facia and fat were removed. The Gluteus Maximus muscle was removed and exposed the piriformis and sciatic nerve. After proper exposure, of the piriformis muscle, exit of the sciatic nerve and its course and bifurcation level on both sides were observed and identified.

Observation

During the routine dissection the variation of sciatic nerve bifurcation was observed bilaterally in the gluteal region of the female cadaver.

Left side of Gluteal Region - On left side gluteal region, the Sciatic nerve bifurcation occurred within the pelvis. The common peroneal nerve (CPN) emerged deep through the piriformis muscle by dividing the muscle in to two parts and tibial nerve (TN) emerged below the inferior border of piriformis muscle. Both the components then run together parallel with each other up to the popliteal fossa. (Figure no 2). The branches are almost normal.

Right side of the Gluteal Region:-Here also the Sciatic Nerve bifurcation occurs within the Pelvis. But the common peroneal nerve emerges at superior border of the Piriformis muscle and tibial nerve emerges to the inferior border of the Piriformis muscle. (Figure no 4) there is no bifurcation of the piriformis muscle in this side.

Discussion

Most of the text books of anatomy, orthopedic and surgery state that the sciatic nerve bifurcation levels are most important in clinical treatment and surgical point of view. Normally, the sciatic nerve passes out through the greater sciatic foramen below the piriformis muscles and divides at the upper angle of the popliteal fossa. But there are chances of variation in bifurcation at different level, which may cause different clinical presentations of Sciatica and piriformis syndrome etc [4 & 5].

The sciatic nerve divides into common peroneal and tibial nerves with in the pelvis and comes out through greater sciatic foramen by dividing or either superior or inferior to the piriformis muscle as separate rout type of variation was explained is some text books. According to a study conducted by Dr J.C.B. Grant, in 640 specimens, he confirmed that the common peroneal nerve passed through piriformis muscle and tibial nerve passed inferior to Piriformis muscle is in 12.2 %. The common peroneal nerve passed through superior border of piriformis muscle and tibial nerve passed inferior to piriformis muscle is in 0.5% cases. [5]

Many anatomists have tried to classify the variations in division of sciatic nerve. According to the L.E. Beaton and Anson B. J who were conducted a detailed study about the sciatic nerve variation and

relation to the Piriformis muscle in 120 specimens in 1937 and in 240 specimens in 1938, have given a well noted classifications. Their classification is known as Beaton and Anson classifications, which is as follows.

Type 1: Undivided sciatic nerve below undivided muscle

Type 2: Divisions of nerve between and below undivided muscle

Type 3: Divisions above and below undivided piriformis muscle

Type 4: Undivided nerve between heads of bifid piriformis

Type 5: Divisions between and above heads of bifid piriformis

Type 6: Undivided nerve above undivided muscle [6]

In the present Case we have obtained bilateral variation of sciatic nerve, in which on left gluteal region we had Type 3 variation. But on right gluteal region the variation is different from above 6 types. That is - Sciatic nerve already divided in pelvis and its two divisions comes out differently from pelvis, one (common peroneal nerve) comes out in between the two heads of bifid piriformis & the other (tibial nerve) comes out below the piriformis. That is shown in the figure no 5 b and c type variations.

Conclusion

This kind of bilateral variations of Sciatic Nerve in relation to piriformis muscle even though very rarely reported, but it has to be considered. These variations of Sciatic Nerve bifurcation at different level may results in nerve injury (during deep intramuscular injections in the gluteal region), piriformis syndrome, injury during the surgical procedures of posterior aspect of hip operations etc. So the knowledge regarding anatomical variations about the level of division of the sciatic nerve and the location where it leaves the pelvis is of great importance for surgeons and physicians, to take care during surgery and to plan accordingly during various surgical interventions of this region, as well as for general practitioners in differentiating the clinical case of sciatica.

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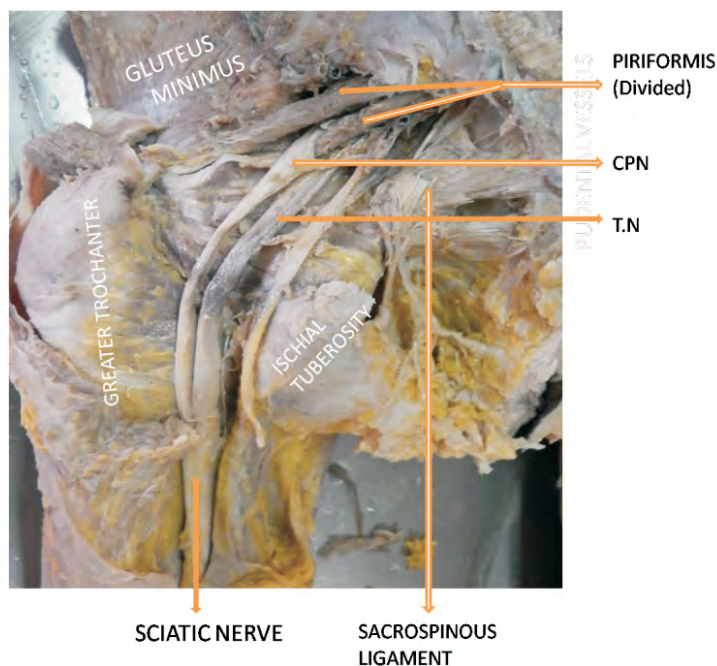
Fig no 1: Bilateral variation of sciatic nerve posterior aspect



P . M – Piriformis Muscle, C.P.N- Common Peroneal Nerve, T.N- Tibial Nerve, S.N- Sciatic Nerve, I.T- Ischial Tuberosity, P.V- Pudental Vessels, S.S.L- Sacrospinous Ligament.

An image showing bilateral variation of bifurcation and exit of Sciatic nerve, and relation to Piriformis.

Fig no 2 - Left Sciatic nerve exit and relation to the Piriformis muscle

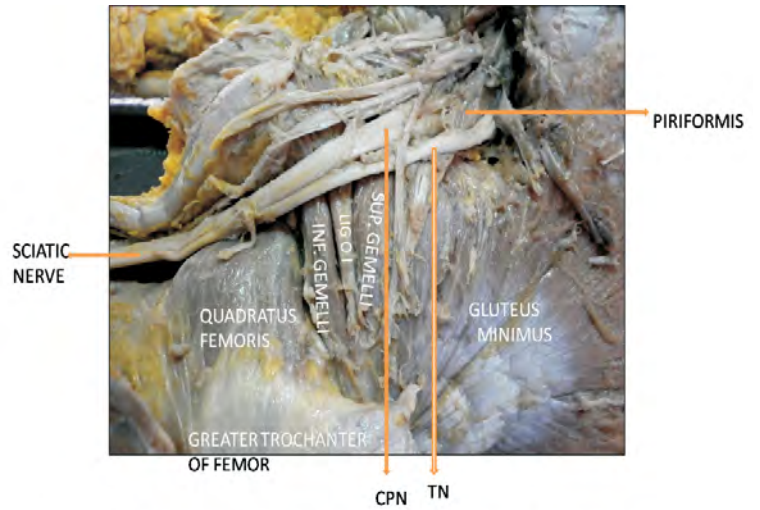


CPN- Common peroneal Nerve, TN- Tibial Nerve.

Fig no 3 - Left side divided Piriformis muscle and two divisions of Sciatic Nerve



Fig no 4 - Right Sciatic nerve exit and relation to Piriformis



LIG O I – Ligament of Obturator Internus, CPN- Common Peroneal Nerve, TN- Tibial Nerve.

Figure no 5 - Diagram showing the variations in the exit of Sciatic nerve

