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Case Report

Bilateral High Division of Sciatic Nerve in Human Cadaver: Unusual and Rare Case Report

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Abstract

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). Presence of bilateral high division of sciatic nerve is a rare variation and due to its rarity, the report is worthwhile to update the clinicians about its occurrence. The middle aged male cadaver was embalmed with formalin and was donated to the department of Human Anatomy, B.P. Koirala Institute of Health Sciences, Nepal for study and research purposes. In this case, the right sciatic nerve was bifurcated 0.5 cm below the lower border of undivided piriformis muscle and the left sciatic nerve was bifurcated at upper third of posterior compartment of thigh. Variations in the exit of sciatic nerve in relation to piriformis muscle may lead to nerve compression, which may result in piriformis syndrome.

Keywords: *Gluteal; Sacral Plexus; Sciatic Nerve; Piriformis Syndrome*

Abbreviations

L: Lumbar; S: Sacral; BPKIHS: B.P. Koirala Institute of Health Sciences

Introduction

The Sciatic is Greek word derived from "Ischiadichus" means ischiadic nerve (Sciatic nerve). 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 nerve passes through the pelvis and projects through the greater sciatic foramen, providing innervation for the lower extremities. The sciatic nerve usually terminates into two branches above the popliteal region forming the common fibular nerve and the tibial nerve [1].

Sciatica is a painful condition that can result in chronic pain for patients. Sciatica can be due to spinal degenerative disc disorders or spinal radiculopathies. The piriformis syndrome has also been identified to account for up to 6 - 8% of sciatica [2]. Presence of bilateral high division of sciatic nerve is a rare variation and due to its rarity, the report is worthwhile to update the clinicians about its occurrence.

Case Presentation

The present case was observed during a routine lower limb dissection for first year medical undergraduates in the Department of Human Anatomy, B.P. Koirala Institute of Health Sciences (BPKIHS), Nepal. The middle aged male cadaver was embalmed with formalin and was donated to the Department of Human Anatomy, BPKIHS, Nepal for study and research purposes. During dissection of gluteal region,

we observed high division of sciatic nerve on both side (Figure 1). On right side, we observed high division of sciatic nerve 0.5 cm below the lower border of undivided piriformis muscle (Figure 2). On left sided dissection of gluteal region and posterior compartment of thigh, the sciatic nerve was bifurcated at upper third of posterior compartment of thigh (Figure 3).

Figure 1: *Photographic illustration of dissected gluteal region: Right Sciatic Nerve (RSN) divided into tibial nerve (TN) and common peroneal nerve (CPN) below lower border of piriformis muscle (PM) and undivided left sciatic nerve (LSN).*

Figure 2: *Photographic illustration of dissected right gluteal region: On right side, we observed high division of sciatic nerve 0.5 cm below the lower border of undivided piriformis muscle. Right Sciatic Nerve (RSN) divided into tibial nerve (TN) and common peroneal nerve (CPN).*

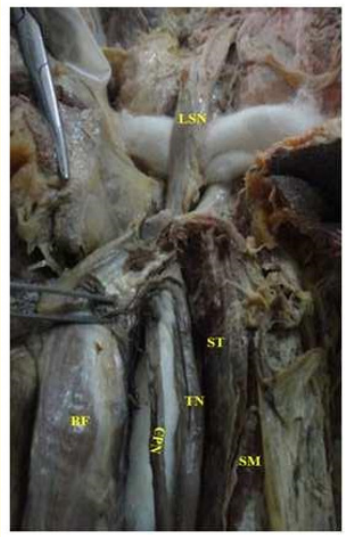

Figure3: *Photographic illustration: On left sided dissection of gluteal region and posterior compartment of thigh, the sciatic nerve was bifurcated at upper third of posterior compartment of thigh. Left Sciatic Nerve (LSN) divided into tibial nerve (TN) and common peroneal nerve (CPN); Rectus Femoris muscle (RF); Semimembranous muscle (SM) and Semitendinous Muscle (ST).*

Discussion

Sciatic Nerve usually divides in the upper angle of popliteal fossa to Common peroneal and Tibial Nerve [3]. Piriformis is the key muscle of the gluteal region. It originates from the anterior border of the second to fourth sacral segment, from the upper margin of the greater sciatic notch, and from the sacrotuberous ligament. Variations in the exit of sciatic nerve in relation to piriformis muscle may lead to nerve compression, which may result in piriformis syndrome. High division of sciatic nerve may lead to incomplete block of sciatic nerve during popliteal block anaesthesia [4]. In the majority of the population, the sciatic nerve passes completely under the piriformis muscle, but in a small portion of cases one of the divisions of the sciatic passes through or over the muscle [5].

Beaton and Anson have classified the relation of sciatic nerve to piriformis muscle in 120 specimens in 1937 and 240 specimens in1938 into six types [6,7].

Their classification is as follows:

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

Various studies had reported about the high division of sciatic nerve in gluteal region. Shewale., *et al.* had reported 11.11% of sciatic nerve division in the gluteal region [8]. In the study done by Anbumani., *et al.* high division of right sciatic nerve was found in 8% of specimens. 4% of sciatic nerve divided in the gluteal region and 4% in the mid-thigh region [9].

The high division of sciatic nerve is rare finding. In this case report, we also found high divisions of sciatic nerve on both sides of same cadaver which differed in location. In present case report, both sided sciatic nerve could be classified as type 1 in relation with the piriformis muscle as per the classification given by Beaton and Anson [8]. The right sciatic nerve was bifurcated 0.5 cm lower border of undivided piriformis and the left sciatic nerve was bifurcated at upper third of posterior compartment of thigh in this case report.

Conclusion

The knowledge about the variations in anatomy in the formation, course and division of sciatic nerve has clinical importance for general surgeons, orthopaedic surgeon, anaesthetists and other medical professionals to avoid surgical complications, to prevent failure of sciatic block, to prevent sciatic nerve injury during deep intramuscular injections, and to understand the mechanism of sciatica.

Conflict of Interests

The authors declare that they have no conflict of interests.

Authors' Contributions

Dr Sandip Shah has prepared the manuscript for publication. Dr Laxman Khanal and Dr Sarun Koirala has performed anatomical dissection. All authors edited the manuscript and prepared the final version for submission. All authors read and approved the final manuscript.

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