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Case Report

Unilateral higher division of sciatic nerve and its clinical importance

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ABSTRACT

The sciatic nerve has a long course right from the pelvis to the apex of the popliteal fossa. The point of division of the sciatic nerve into tibial and common peroneal nerves is very variable. The variation in the division of the sciatic nerve described in the present study should be helpful for anaesthetists and orthopaedic surgeons. While doing the dissection and teaching of the gluteal region in the Post Graduate Department of Anatomy, government medical college, Jammu, it was found that on the left side tibial nerve and common peroneal nerve were present instead of sciatic nerve. It meant that the main nerve that is the sciatic nerve had already been divided into its terminal branches in the pelvis region. Both tibial and common peroneal nerve were seen coming out of the pelvis below the piriformis muscle, while on the right side there were no variation. The sciatic nerve was seen coming out of the pelvis below the piriformis muscle as usual. Because of this high division of the sciatic nerve in the pelvis, there are many complications like failed sciatic nerve block during anaesthesia while performing surgery, but high division of the sciatic nerve may result in escape of either tibial nerve or common peroneal nerve. The gluteal region, back of the thigh and leg of the lower limb were dissected to study further course of tibial nerve and the common peroneal nerve. Photographs were also taken.

Keywords: Common peroneal nerve, Gluteal region, Pelvis, Piriformis muscle, Sciatic nerve, Tibial nerve

INTRODUCTION

The thickest nerve in the body is the sciatic nerve. Its width is 2 cm at the point of its beginning.[1] The sacral plexus gives rise to the large sciatic (ischiadic) nerve. It runs through the buttock to supply the posterior muscles of thigh and all the muscles below the knee.[2] Its root value is L4, 5, S1, 2, 3. After its origin in the pelvis, it enters the gluteal region through the greater sciatic foramen below the piriformis. It is one of the structures which lie deep to the gluteus maximus muscle. It then runs downwards between ischial tuberosity and greater trochanter. Tendon of obturator internus with the gamelli, quadratus femoris and adductor magnus all form deep relation.

Normally it divided into its two terminal branches that is tibial nerve and common peroneal nerve at the superior angle of the popliteal fossa. But there may be variations in the level at which the sciatic nerve divided. The point of division of sciatic nerve into tibial and common peroneal components is very variable. The variations in the piriformis muscle and the sciatic nerve has also been classified.[3] It may divide higher in the pelvis or above the level of superior angle of the popliteal fossa. The sciatic nerve has a long course, so it can be injured at various levels.

This variation in the division of sciatic nerve has also been observed by many authors.[4-7] These variations may cause muscle atrophy or sciatica. So, it is very important for the physicians and surgeons to know the variations in the division of sciatic nerve. As the sciatic nerve is closely related to the piriformis muscle. This muscle may compress the sciatic nerve and cause the piriformis syndrome.[5]

CASR REPORT

During routine dissection and teaching of the cadaver to the first prof. MBBS students in the post graduate department of anatomy, government medical college, Jammu., the high division of the sciatic nerve was found on the left side. Instructions given in the Cunningham's manual of practical anatomy4 were followed. The divided nerves remained separate throughout their course. Photographs were taken to demonstrate the high division of sciatic nerve. The pattern of the vessels of lower limb was normal.

The two terminal branches that is tibial nerve and common peroneal nerve come out of the pelvis below the piriformis (Figure 1).

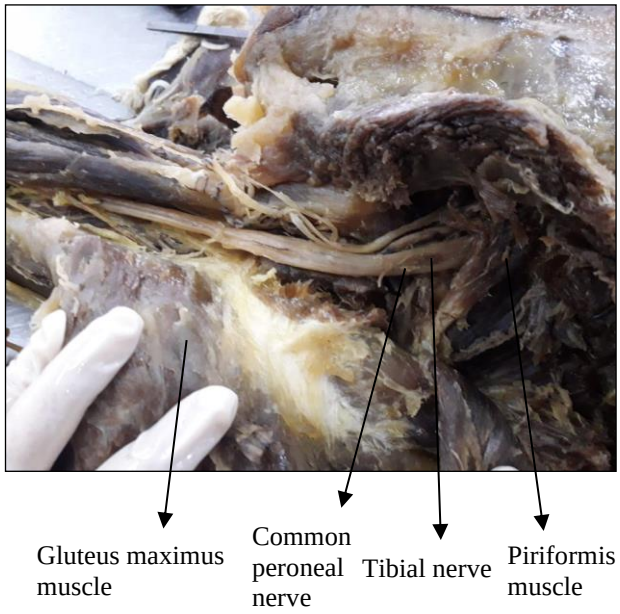

Figure 1: Tibial nerve and common peroneal nerve coming out below the piriformis muscle on left side.

DISCUSSION

As there are many variations in the level of division of sciatic nerve right from the point of its origin to its termination. It arises from the sacral plexus and is the thickest nerve of the body. It comes out through the greater sciatic foramen below the piriformis muscle. At the superior angle of the popliteal fossa, it divides into tibial nerve and the common peroneal nerve. The sciatic nerve may divide into its terminal branches at a higher level even inside the pelvis. The division of sciatic nerve into its terminal branches may occur high up inside the pelvis, in the gluteal region or in the upper thigh. The sciatic nerve may be injured in the dislocation of the hip joint. This nerve may pass through the piriformis muscle while coming out of the pelvis and may be compressed in this muscle causing piriformis syndrome.[5] The common causes of injuries to the sciatic nerve are iatrogenic. It may be injured while giving intramuscular injections in the gluteus maximus muscle. It is safer to give injections in the quadriceps muscle. But this may cause contracture of this muscle. The anatomical variations in the course of sciatic nerve may cause piriformis syndrome, sciatica and muscle atrophy. In dislocation or fracture of the hip, sciatic neuropathy may occur. Beaton and Anson classified variations in the piriformis muscle and the sciatic nerve.[3] This 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 nerves.
Type 4: Undivided nerve between heads.
Type 5: Divisions between and above heads.
Type 6: Undivided nerve above undivided muscle.

In this study author found a case of higher division of the sciatic nerve in the pelvis on the left side. Authors finding in the variation in the division of the sciatic is also favored by other authors. According to them, sciatic nerve can divide at any level right from its origin to its termination. There is a great variation in the level of division of the sciatic nerve. Similar case of high division of sciatic nerve but on both the sides along with variation in the inferior gluteal nerve was reported6. But in this study the pattern of inferior gluteal nerve and vessels was normal. Authors finding is not in accordance with one author who observed divided piriformis muscle as in present study, there was no division of piriformis muscle.[7] Trifurcation of sciatic nerve was also noted by one author.[8] This knowledge about variable variations in the division of sciatic nerve is of great clinical significance.[9] Authors finding of high division of sciatic nerve is also in conformity with the research work by Neeta V Kulkarni that sciatic nerve divided into terminal branches high up inside the pelvis, in the gluteal region or in the upper thigh.[10] This knowledge may be helpful for surgeons who have to do many surgical manipulations. Lack of knowledge about variation in the level of division of sciatic nerve into its two terminal branches that is tibial and common peroneal nerves may cause complications during surgical repairs like fracture of femur. It is also important for anesthetists to consider the higher division of the sciatic nerve during popliteal block anaesthesia.

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