SHORT REPORT

A Rare Variation in the High Division of the Sciatic Nerve Surrounding the Superior Gemellus Muscle

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Abstract

The sciatic nerve normally leaves the pelvis by passing through the greater sciatic foramen below piriformis. However, it may divide into its common fibular and tibial nerve components within the pelvis and its relationship with piriformis is variable. In this paper, we describe a new anatomical variation in which the common fibular nerve passed superior, and the tibial nerve inferior, to the superior gemellus muscle. Anatomical variations such as these may contribute to piriformis syndrome, coccygodynia and muscle atrophy.

Keywords: Gross anatomy, peripheral nerve, sciatic nerve, gemellus superior muscle, anatomical variation.

Introduction

The sciatic nerve (SN), is a broad, flat branch of the sacral plexus and the largest nerve in the body. After leaving the pelvis through the greater sciatic foramen, it generally passes beneath piriformis (Testut & Jacob, 1944; Anson & McVay, 1971; Hollinshead, 1976; Bergman et al., 1988). The nerve usually divides into the common fibular (peroneal) and tibial nerves in the popliteal fossa. Often these two nerves arise separately from the sacral plexus. Sometimes they may be divided in the greater sciatic foramen by the piriformis muscle and pass into the thigh as contiguous, but separate structures (Testut & Jacob, 1944; Hollinshead, 1976; Bergman et al., 1988). However, there may be numerous variations both in the course and distribution of the SN (Beaton & Anson, 1938; Testut & Jacob, 1944; Lee & Tsai, 1975; Hollinshead, 1976; Bergman et al., 1988; Gabrielli et al., 1994; Machado et al., 2003). The main variations concern the relationship of the nerve to piriformis (Beaton & Anson, 1938; Kubota et al., 1960; Lee & Tsai, 1975; Hollinshead, 1976; Gabrielli et al., 1994; Machado et al., 2003). In the present paper, we present a new anatomical variation, where a high division of the SN occurs in relation to the superior gemellus muscle.

Case report

During a regular dissection procedure in the anatomical laboratory from the State University of Rio de Janeiro, a male cadaver showed a high division of the SN, on the left side of the body (Fig. 1), while normal anatomy was found on the right side.

In this case, the common fibular nerve passed beneath piriformis, and the tibial nerve was observed under the inferior margin of the superior gemellus muscle, instead of its normal position on the superior margin of the gemellus.

Discussion

Piriformis syndrome and coccygodynia are associated with some SN variations due to compression of the nerve by hypertrophy or contraction of piriformis. This pathological
modification could lead to sensory, motor and trophic disturbances in the areas innervated by the SN (Solheim et al., 1981; Sunderland, 1985). The resulting pain and paresis in the gluteal region may affect the biomechanical function of the pelvis and lead to postural abnormalities and locomotor instability.

There are three types of variations characterized by the high division of the SN, and a fourth type that seldom occurs (Anson & McVay, 1971; Williams et al., 1989; Machado et al., 2003). These variations are classified as types I, II and III (Gabrielli et al., 1994). In type I, the common fibular nerve passes through the piriformis muscle and the tibial nerve runs beneath its inferior margin. This phenomenon was described in adults appearing in approximately 10–12% of cases (Anson & McVay, 1971; Bergman et al., 1988). In foetuses, this variation was observed in 16% of cases (Machado et al., 2003).

In the type II variation, the common fibular nerve extends over the superior margin and the tibial nerve passes under the inferior margin of piriformis. This type is found in approximately 2–3% of cases (Beaton & Anson, 1938; Anson & McVay, 1971; Lee & Tsai, 1975; Hollinshead, 1976; Gabrielli et al., 1994; Machado et al., 2003). In the type III variation, found in 2% of cases, the SN does not divide and passes through piriformis (Anson & McVay, 1971; Machado et al., 2003). Rarely, the undivided SN passes above piriformis – the type IV (Williams et al., 1989).

A review of the literature shows that the SN most commonly passes inferior to piriformis and divides into its common fibular and tibial nerve components in the popliteal fossa. Four variations in the relationship of the SN and its components with the piriformis muscle have been described. This is the first report of a new anatomical variation in which the common fibular nerve passed between piriformis and the superior gemellus muscles and the tibial nerve passed inferior to the superior gemellus.

Acknowledgement

The authors wish to thank Professor Mandarim-de-Lacerda, CA, MD, PhD (UERJ), for support in revising the manuscript.

References

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