

Sacral Lateral Artery: Anatomical Variation and Clinical Significance

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Abstract

The lateral sacral artery is a standard branch of the posterior trunk of the internal iliac artery. The variations and branching patterns of the lateral sacral artery (LSA) and its branches are very crucial for surgeons. The current study describes the variability of lateral sacral artery and its incidence to provide a sufficient anatomical data for clinicians, radiologists, and orthopedics to increase success rate of any surgical interferences of pelvis.

The lateral sacral artery was observed in 30 halves of pelvis in 15 cadavers (15 right and 15 left) died in the age of 55-70 years used for routine dissection.

The variation of arising, asymmetry and sexual differences of LSA were described in the article.

Introduction

The lateral sacral artery is a standard branch of the posterior trunk of the internal iliac artery as well as iliolumbar and superior gluteal. There are two lateral sacral arteries usually: the superior and inferior [1,2]. The superior LSA passes in medial direction into the upper two anterior sacral foramen and then enters

the sacral canal. The inferior LSA passes in anterodorsal direction and then enters the lower anterior sacral foramina [2]. We have found in literature that the LSA can be represented by one, two, three, or even four branches [3,4].

It should be noted, the lateral sacral arteries rarely anastomose with the median sacral artery [5,6], since they are distributed more superficially on the anterior surface of the sacrum and coccyx than the last artery.

According to some studies, in 7-14% of cases, the lateral sacral artery may be absent at all [7].

The lateral sacral arteries supply blood to the pelvic and perineal muscles, skin in the sacral region, as well as the sacral vertebrae and the contents of the sacral canal.

The individual variations of the internal iliac artery branches can be found in row of scientific publications dedicated to their anatomy and involving in surgery [8,9]. However, the most of studies describe the visceral branches, while the parietal ones are not well outlined in the literature [10]. The variability of the LSA has significant value in anatomy and surgery, because of its involving in many dangerous clinical pathologies, like lateral sacral artery aneurysm, epidural hemorrhage [11], repair of sacral and ischial region defects with lateral sacral artery perforator flaps [12].

The deep knowledge of the anatomy of lateral sacral artery and its variability may help the surgeons to minimize the intra and postoperative complications [13,14].

The aim of this study was to investigate the individual variability of lateral sacral artery.

Materials and Methods

The material of investigation was 15 cadavers of males and females died in the age of 55-70 years without pathology of vascular system. Two halves of each cadaver's pelvis were involved in research, so 30 specimens were used in total. The study was carried out with the help of dissection method, anthropometry, morphometry of blood vessels of pelvis and statistical processing (we used PC soft Statistica 10.0).

Results

The current study shows that the lateral sacral artery with a diameter of $0,22\pm 0,12$ cm and a length of 0.58 to 5.95cm in 76.9% of cases arose from the posterior trunk of the internal iliac artery. In 11.5%, the LSA took origin from the internal iliac artery directly. Occasionally, the lateral sacral artery arose from the superior gluteal artery (in 3.9%), with a single trunk with the iliolumbar artery which started from the internal iliac proper (in 3.9%) and in 3.9% of cases we had noted the arising of single lateral sacral artery from the internal iliac artery proper.

Our study had shown the asymmetry of the LSA. Therefore, the lateral sacral artery arose from the internal iliac artery directly only on the right side. At the same time, the LSA took origin from the superior gluteal artery only on the left half of pelvis. The arising of the LSA from the posterior division of internal iliac artery was slightly more frequent on the left (85.7%) comparing with the right (66.6%).

Moreover, the sexual differences in the beginning of the lateral sacral artery were shown in the present study. It was noted that the LSA was more variable on female's pelvises. The origination LSA from the internal iliac and superior gluteal arteries met only in female. The arising of the lateral sacral from the posterior trunk of internal iliac was noted more frequently in male (in 87.5%), whereas in female in 72.2%. Sufficient to say that in male the left LSA was more variable. The right LSA arose from the posterior trunk of internal iliac in 100% of cases, whereas the left one - only in 80%. As it was mentioned above, in female, the lateral sacral artery is more variable: it took origin from posterior division of internal iliac in 55.5% of cases on the right, and in 88.9% on the left.

In addition, the lateral sacral artery is longer in female (2.26 ± 0.88 cm) than in men (1.93 ± 0.53 cm). In male, the right LSA is shorter (1.67 ± 0.50 cm) than the left one (2.11 ± 0.71 cm).

In 43.3% of cases, superior and inferior branches of LSA took origin as two separated vessels.

Conclusion

The most common origin of the LSA is the posterior trunk of the internal iliac artery is (76.9%).

The variation in origination of lateral sacral artery, asymmetry and sexual differences has been shown in the article.

Therefore, the lateral sacral artery origin, course, and ramification are important for clinicians to improve their knowledge and patient management.

Conflicts of Interests

The authors declare that there is no conflict of interest.

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