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The diversity of the medial circumflex femoral artery origin and its radiological and surgical intervention importance

Mr. Ravikumar Urjana,Research Scholar, Malwanchal University

Prof.Dr.Vimal Modi ,Research Supervisor, Malwanchal University

Introduction

The medial circumflex femoral artery emerges from the deep femoral artery's medial or posterior side. Circumflexa femoris interna or arteriae circumflexae femoris medialis were the names given to this condition. The medial circumflex femoral artery divides into two branches at obturator externus: ascending and descending anterior and posterior, muscular and articular, and superficial and deep. The medial circumflex femoral artery provides blood to the adductors, gracillis, obturator externus, and hamstring muscles. It also feeds the sciatic nerve. It forms a cruciate anastomosis with the inferior gluteal, lateral circumflex femoral, and first perforating arteries, feeding the head and neck of the femur. Additionally, the medial circumflex femoral artery is an important artery in the vascularization of the head and neck of the femur. The variability of the medial circumflex femoral artery throughout development and regression of the principal axial artery results in varied lower extremity supplies.

The present research focuses on the origin and level of the medial circumflex femoral artery. With a solid understanding of the anatomical features of the medial circumflex femoral artery, it may be possible to reduce postsurgical difficulties in radiography, vascular surgery, and orthopaedic professions.

Methodology

The current investigation included the dissection of 200 hemipelves from 100 cadavers to investigate the origin and branches of the medial circumflex femoral artery. This research is being carried out at Index Medical College in Indore. To give an accurate incidence of the variance, the missing data has been eliminated. The origin variability of the medial circumflex femoral artery, as well as its level in comparison to the deep femoral and lateral circumflex femoral arteries, have been documented in order to offer adequate data for radiologists during femoral catheterization.

Deep palpation is required prior to anterior and medial compartment dissection to identify the anterior superior iliac spine and pupic tubercle. To clear the anterior compartment, an oblique incision must be made below the inguinal ligament ends. The detachment, which includes the skin, membranous layer, and fatty layer, must next be removed. The vast saphenous course necessitates extreme caution while removing subcutaneous tissue. The great saphenous vein drains into the femoral vein by passing across the medial side and penetrating a gap in the deep fascia known as fossa ovalis where the lateral boundary is known as the falciform margin. The deep fascia should then be removed as soon as the anterior compartment muscle can be examined. The quadriceps femoris, Sartorius pectineus, iliacus, and iliopsoas are all located in the anterior compartment (psoas major and minor). The quadriceps femoris is divided into four heads: the rectus femoris, the vastus lateralis, the vastus medialis, and the vastus intermedius. These prior muscles create a triangle known as the femoral triangle, which is formed by the inguinal ligament superiorly, the Sartorius laterally, and the adductor longus medially. The latter muscle partly forms the floor of this triangle, which is completed by the iliopsoas and pectineus. From lateral to medial, the femoral triangle comprises the femoral nerve, artery, vein, and ring (contains a lymph node). The femoral sheath, which incorporates the final three components creating three compartments, is referred to as the deep fascia of the abdominal wall expansion. The medial, middle, and lateral compartments terminate the femoral canal, femoral vein, and femoral artery, respectively. Before eliminating time to explain the femoral artery and its branches, a femoral vein system must be investigated in connection to the femoral artery. The femoral artery begins as a continuation of the external iliac artery right below the inguinal ligament and ends as the popliteal artery at the adductor (Hunter) hiatus. Radiologists refer to the femoral artery as the common femoral artery. As a result, the common femoral artery divides into two branches: superficial and deep femoral (profunda femoris). Therefore, the superficial femoral artery is a section that begins at the femoral artery and ends at the adductor hiatus as the popliteal artery. The superficial femoral artery must be followed until it terminates as the popliteal artery. Although the profunda femoris artery normally supplies medial and lateral femoral circumflex arteries, the femoral artery often divides into superficial and deep femoral arteries. The medial femoral circumflex branch goes between the pectineus and the iliopsoas

and separates into anterior and posterior branches. To clear this artery, the femoral vein and its trabiturates must be removed. During the removal of the medial femoral circumflex vein, considerable care must be taken to prevent the extraction of the medial femoral circumflex branch. The medial femoral circumflex branch is a normal branch of the profunda femoris artery, however it may develop independently or dependently (same trunk) from the common and superficial femoral arteries. Additionally, the medial circumflex femoral artery may form in conjunction with the superficial and deep femoral arteries. It may also occur in conjunction with the preceding two arteries and the lateral circumflex femoral artery.

Results

In the current research, 35% of the medial circumflex femoral arteries emerge from the common femoral artery. It developed independently from the common femoral artery in 20% of cases and dependently from the deep femoral artery or the lateral circumflex femoral artery in 15% and 18% of cases, respectively. In 2% of cases, it was shown to originate from the common femoral artery, with superficial and deep femoral arteries and the lateral circumflex femoral artery. In 1% of instances, the medial circumflex femoral artery develops from the common femoral artery and the external pudendal artery. The common femoral artery divides into superficial and deep femoral arteries, and it develops from the superficial and deep femoral arteries in 3% and 56% of cases, respectively. The medial circumflex femoral artery develops independently from the deep femoral artery 51% of the time and dependently from the lateral circumflex femoral artery 6.6% of the time. In 0.8% of instances, the medial circumflex femoral artery develops from the lateral circumflex femoral artery. In 0.8% of cases, there was a congenital absence.

The origin level of the medial circumflex femoral artery in respect to the deep femoral artery is variable. In 17.1% and 56.12% of cases, the medial circumflex femoral artery originates proximal and distal to the deep femoral artery origin. Yet, in 26.7% of cases, the roots of both arteries have the same level. In 0.8% of cases with congenital absence of the medial circumflex femoral artery, comparing the origin level of the medial circumflex femoral artery to the origin level of the deep femoral artery is challenging. The origin level of the medial circumflex femoral artery differs from that of the lateral circumflex femoral artery. In 53% and 21.4% of cases, the medial circumflex femoral artery originates proximal and distal to the lateral circumflex femoral artery origin. Yet, in 23.1% of cases, the roots of both arteries had the same level. In 1.8% of cases with congenital absence of the medial circumflex femoral artery, comparing the origin level of the medial circumflex femoral artery to the origin level of the lateral circumflex femoral artery is challenging.

Conclusion

Knowing the physical features of the medial circumflex femoral artery may aid in reducing the occurrence of femoral head avascular necrosis after embolization, arterial catheterization, or hip surgery. As a result, radiologists must be informed of the origin of the medial circumflex femoral artery in order to warn vascular and orthopaedic surgeons and reduce iatrogenic mistake. As a result, the varying origin and level of the medial circumflex femoral artery is clinically significant in modifying the end-to-end arterial bypass treatment or interposition graft operation leading to intact vascular supply of the lower limbs.

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