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Anatomical variations of femoral artery in the site of origin of femoral, superficialcircumflexIliac, superficialepigastric, superficial& deep external pudendal arteries

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Abstract:
Background: *In the realm of medicine, it is general knowledge that the femoral artery can function as an entry point for a broad variety of diagnostic and investigative procedures to be carried out.* ***Aim:*** *The present study is to determine the anatomical variations of femoral artery in the site of origin of femoral, superficialcircumflexIliac, superficialepigastric, superficial& deep external pudendal arteries.* ***Materials & methods:*** *The Institutional Ethics Committee gave the go-ahead for this work to be done. After it was approved, this study got under way. This was the cadaveric study that was done on a total of 60 embalmed and formalin-fixed remains from the anatomy departments of Index Medical College & Hospital. Sixty bodies that had been preserved with formalin were used in the study (38 male and 22 female).* ***Results:*** *The origin of the femoral artery coincided with the mid inguinal region in 55 of the 60 lower leg specimens that were dissected. These specimens were taken from different parts of the leg. This equates to an overall success rate of 95%. In 5% of cases, the origin of the femoral artery was discovered to be on the lateral side of the mid inguinal region. It was discovered that the Superficial Epigastric Artery (SEA) originated from the femoral artery as a separate trunk in 52 of the 60 cases (92 percent), and that it came from the femoral artery as a single trunk with the Superficial External Pudendal Artery (SEPA) in 8 of the cases (8%). The dissections of the lower extremities yielded the information that was gained from them.* ***Conclusion:*** *There are differences regarding the origin of the FA, SEA, and SEPA. This research will be helpful to surgeons and orthopedists performing femoral surgery. It will also be valuable to radiologists for image interpretation and to doctors before interventional procedures are performed.*

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I. Introduction:

In the realm of medicine, it is general knowledge that the femoral artery can function as an entry point for a broad variety of diagnostic and investigative procedures to be carried out [1-6]. These procedures can range from simple to complex. These operations are adaptable and can be performed on a wide variety of patients who are suffering from a variety of illnesses [2,3]. Angiographies, the insertion of central lines, ultrasonography, Doppler imaging, digital subtraction angiography, and magnetic resonance imaging are only a few of the diagnostic procedures that can be categorized as being under the umbrella term of magnetic resonance imaging (MRI) [4-13]. It is crucial to have a comprehensive understanding of the anatomy of these structures [14], as the femoral artery and its branches are frequently used by surgeons and radiologists in a wide variety of procedures. This is due to the fact that the femoral artery as well as all of its branches are utilized quite frequently over the course of various surgical treatments. In addition to this, it is of the utmost importance to remain vigilant regarding any changes that might take place inside the femoral artery and any of its branches [15]. It is of the utmost significance to maintain an awareness of these shifts. Clinicians in this day and age of interventional radiology need to have a precise understanding of the anatomical variations that apply to the origins of the profunda femoris as well as the medial and lateral femoral circumflex arteries [1,4,9,14,15]. These variations can be found in the profunda femoris as well as the medial and lateral femoral circumflex arteries. In addition to the medial and lateral femoral circumflex arteries, the profunda femoris also exhibits these variants of its blood vessel structure. Each individual component of the profunda femoris, including the medial and lateral femoral circumflex arteries, as well as the profunda femoris itself, possesses its own set of distinctive

characteristics. This is due to the fact that the differences discussed above have the ability to have a major impact on the results that a patient's treatment brings about.

The present study is to determine the anatomical variations of femoral artery in the site of origin of femoral, superficialcircumflexIliac, superficialepigastric, superficial& deep external pudendal arteries.

II. Materials & Methods:

The Institutional Ethics Committee gave the go-ahead for this work to be done. After it was approved, this study got under way. This was the cadaveric study that was done on a total of 60 embalmed and formalin-fixed remains from the anatomy departments of Index Medical College & Hospital. Sixty bodies that had been preserved with formalin were used in the study (38 male and 22 female).

This was the cadaveric study, and it was done on a total of 60 bodies that had been embalmed and fixed with formalin. The study was done on the remains of sixty people (38 men and 22 women) from the anatomy departments of Index Medical College and Hospital. Here is how 120 femoral triangles were cut into smaller pieces. At the front of the thigh, the skin and the top layer of fascia will both be cut and pulled back. This was done to make the cut for the transfer of the fascia. To get to the femoral triangle, the great saphenous vein and the superficial inguinal lymph nodes have to be taken out. In addition, a cut has to be made in the fascia lata. It is figured out where the inguinal ligament is, and then it is taken out of the body and looked at. In order to look at the femoral artery and its main branches, the femoral sheath needs to be broken open so that the blood vessels inside can be seen. The medial and lateral circumflex femoral branches of the profunda femoris artery would be carefully cut out after being carefully cut and named. Then, they are carefully cut apart. It was to find out where they started their journey and where they were going to end it. They also measured the distance between where they started and where the profunda femoris artery starts and wrote down what they found. They also figure out how far it is from where they started to where they need to go. With vernier callipers, the diameter of the profunda femoris artery was measured near where it splits off from the femoral artery. This lets accurate results come out. The results of this measurement would be written down so that they can be used in the future.

III. Results:

The origin of the femoral artery coincided with the mid inguinal region in 55 of the 60 lower leg specimens that were dissected. These specimens were taken from different parts of the leg. This equates to an overall success rate of 95%. In 5% of cases, the origin of the femoral artery was discovered to be on the lateral side of the mid inguinal region.

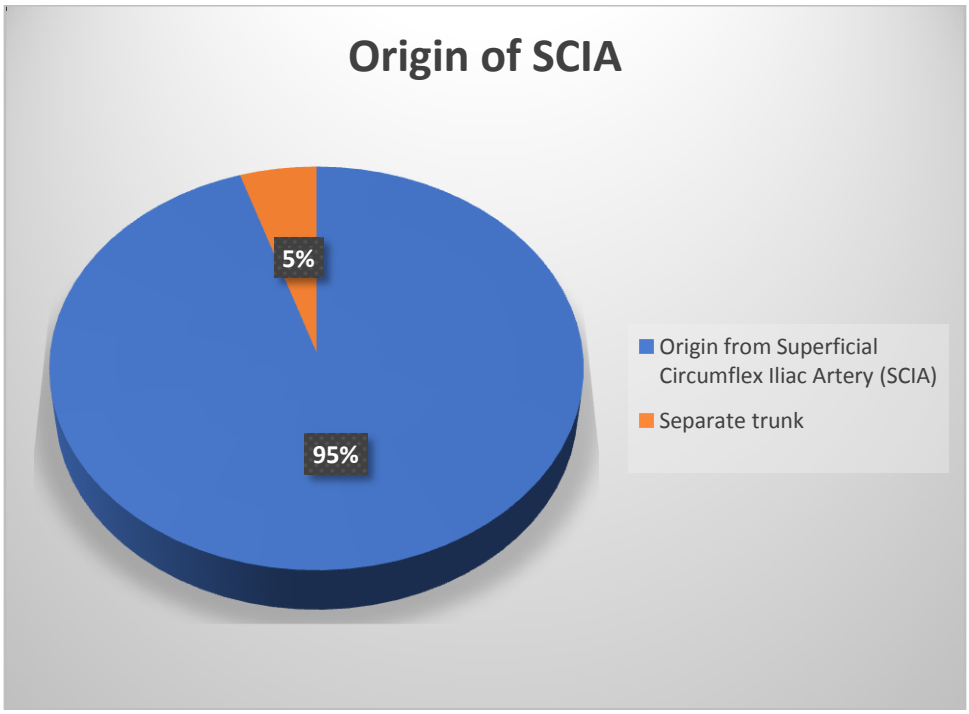
Table 1: Femoral artery origin and its relation to the Mid-Inguinal Point

Origin of Femoral artery	Frequency	Percentage
At the Mid-Inguinal Point (MIP)	55	95%
Lateral to MIP	5	5%

The Femoral Artery (FA) relationship with the Femoral Vein (FV) in the Femoral Triangle

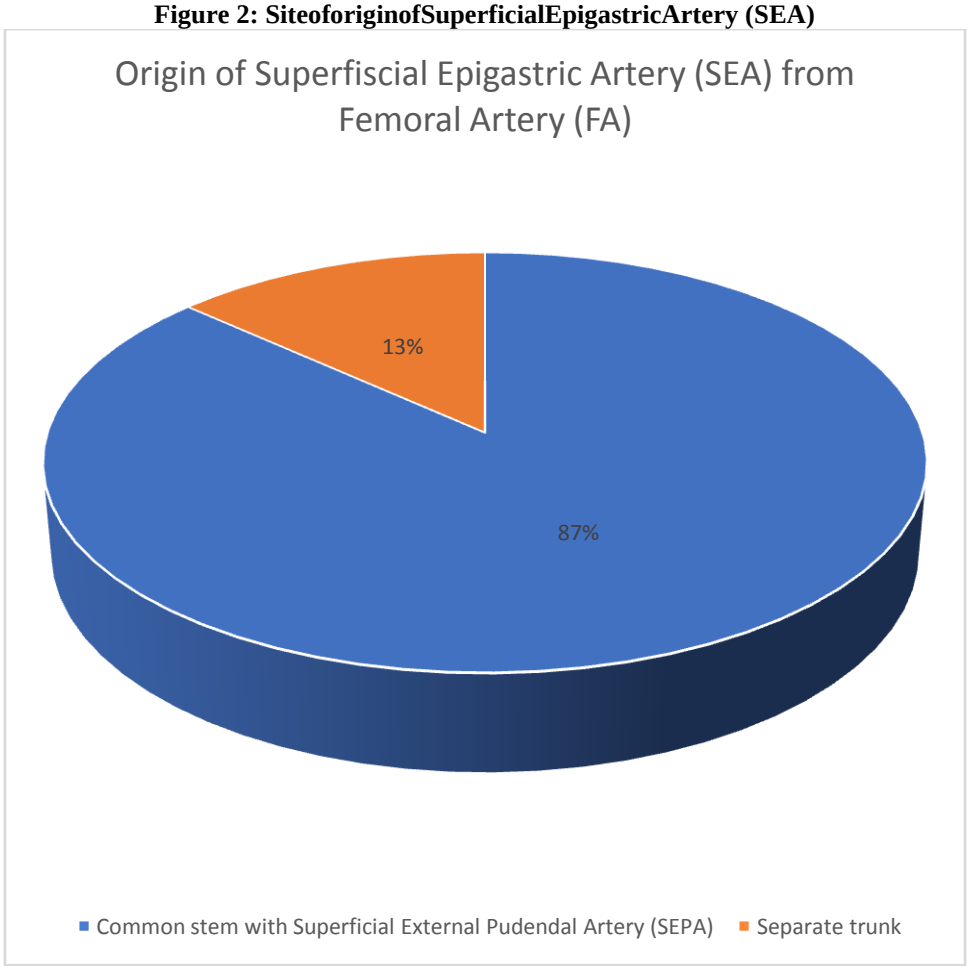
The femoral vein was located in the upper part of the femoral triangle, medial to the femoral artery, and posterior to the femoral artery at the apex of the femoral triangle in each of the sixty lower limb specimens that were studied. Its location was consistent across all of the specimens. Its placement remained the same throughout each of the investigations that were conducted. Researchers of the present study in the Department of Anatomy at Index Medical College discovered, through the examination of cadavers, that the FA runs through the middle of the femoral triangle, that the FV is medial to the FA, and that the GSV drains into the FV. These findings were made possible by the fact that the FA runs through the middle of the femoral triangle. The fact that the FA passes through the center of the femoral triangle made it possible to conduct the research that led to these conclusions. When the femoral nerve is positioned so that it is lying to the side of the femoral artery (FA), its branches can be observed.

Figure 1: Site of origin of Superficial Circum flexIliac Artery (SCIA)



Only three out of the sixty cases that were investigated did not show evidence of the SCIA developing as a distinct trunk from the FA. Yet, it did grow into a distinct trunk from the FA in the remaining fifty-seven cases, which accounts for 95% of the total cases.

Figure 2: SiteoforiginofSuperficialEpigastricArtery (SEA)



It was discovered that the Superficial Epigastric Artery (SEA) originated from the femoral artery as a separate trunk in 52 of the 60 cases (92 percent), and that it came from the femoral artery as a single trunk with the Superficial External Pudendal Artery (SEPA) in 8 of the cases (8%). The dissections of the lower extremities yielded the information that was gained from them.

SiteoforiginofSuperficialExternal PudendalArtery (SEPA)

There were a total of 60 occurrences, and out of those, the SEPA began as a separate trunk from the FA in 50 of them (which accounts for 80% of the total), as a single stem with the SEA in 8 of them (12%), and there was a duplication of the SEPA in 4 of those occurrences (which accounts for 8% of the total).

Connection of the Great Saphenous Vein to the Superficial Epigastric Artery and the Superficial External Pudendal Artery (SFJ),

In the Sapheno Femoral Junction, the Superficial External Pudendal Artery (SEPA) was not visible in twenty percent of the cases that were examined. In addition, the SEPA was found to go anterior to the Great Saphenous Vein (GSV) in thirty-one percent of the patients, and in forty-eight percent of the cases. Above the Superficial Femoral Junction (SFJ) In the 12 cases (21%) in which the SEPA was not discovered at the SFJ, it was discovered to be located above the SFJ, in close proximity to the Superficial Epigastric Artery (SEA) and the Superficial Circumflex Iliac Artery (SCIA). Both the Superficial Epigastric Artery (SEA) and the Superficial Circumflex Iliac Artery (SCIA) were discovered to be located below the inguinal ligament (IL).

Origin of Deep External Pudendal Artery (DEPA):

The deep external pudendal artery (DEPA) was found to have originated on the medial side of the femoral artery in each one of the sixty specimens that were examined, and it travelled medially in the direction of the external genitalia. This finding was consistent across all of the specimens. In four of the cases, the DEPA began its journey both distally and medially from the FA's point of origin.

Discussion:

The anterior thigh artery (FA) enters the thigh where the anterior superior iliac arteries (ASIS and PS) converge. Several studies supported these findings (16-21). The femoral artery begins behind the inguinal ligament, according to studies [18,19]. The FA is within 1.5 cm of the MIP on both sides, therefore the MIP can help find the FA [20]. The FA can be found using the MIP as a map. [Citations needed] Because the MIP and FA are near. A study found that the deep inguinal ring and FA surface signals are closer to the MIP than the middle of the inguinal ligament [18]. The study suggests this. The MIP caused FA in 55 of 56 patients in the last study. This matches previous investigations. In 5% of cases, the MIP and FA seemed side by side.

The MIP-FA relationship may change. Diagnostic and interventional therapies require femoral artery (FA) access. Catheters are used most often. To reach the FA, the patient will have a catheter inserted. Students must remember that the FA can start on the side or centre of the MIP. They must remember this throughout the process. Students must understand this topic before beginning. They need this information to proceed. Doctors and other medical professionals can usually receive their FA and MIP simultaneously. Possible. If they can't, which is improbable, the foregoing information will help.

The Superficial Circumflex Iliac Artery originates where?

The femoral vein is on the medial side of the femoral artery in the upper half of the triangle [22–28]. The femoral triangle is this hip area. A single study [24] reported that the femoral artery medially contacted the vein in 27% of patients and partially overlapped with it in 73%. This linked the two structures in these percentages. In another study [25], 72% of patients had FVs that did not match FAs at IL. These findings were based on patient heart rates. The FV is behind the duplicated superficial femoral artery, according to studies [23]. The superficial femoral artery copying revealed this. According to, in the femoral triangle, the FV entirely overlapped the FA in 8%, partially overlapped it in 4%, and was medial to it in 88%. Percentages: The FV overlapped the FA fully in 8% of cases and partially in 4%. The FV entered the adductor canal posterolateral to the FA [26–28]. Adductor muscle says so.

The femoral vein was behind the femoral artery (FA) at the top of the triangle and close to it below the inguinal ligament in all 60 samples. All specimens were aligned. In this investigation, the FV and FA did not intersect below the IL, unlike many previous studies. [Cite] Recent investigations confirmed this.

The FA travelled via the femoral triangle, the FV was close to the FA, and the GSV drained into the FV during the dissection of a six-month-old baby. These opinions were expressed simultaneously. Medically, a hole in the femoral vein might damage the artery. Arteriovenous fistulas may result. Because of this, it's crucial to know the FA and FV's regular positions and any variations.

According to study [29], 25% of SCIA instances were absent, 45% developed as a separate trunk from FA, 15% shared a stem with SEA, and 15% shared a stem with SEPA. SCIA and SEA came from the same trunk in 79% of 100 dead patients in another investigation [30]. One study [31] claims the FA branched near the PFA. This branch separated into SEA, SEPA, and DEPA. SCIA was absent. Another study [32] indicated that the SCIA derives from the FA as a separate branch 52.5% of the time, from the FA by a common stem with

SEA 40%, from the FA by a shared trunk with SEPA and SEA 2.5%, and from the PFA 5%. A CT on the anterior-lateral side of the PFA induced SCIA and SEA in a case report [33].

Only three of sixty cases in this investigation did not exhibit indicators that the SCIA grew as a distinct trunk from the FA. Just in these three cases. In the remaining 57 cases (95%), it split off from the FA and became a distinct trunk. The SCIA was absent in 8% of cases, but 25% in Taylor and Daniel's investigation.

The SCIA and SEA artery networks usually start groyne flaps. SCIA flaps avoid the difficulty of other groyne flaps by leaving the deep fascia in situ. SCIA flaps replaced groyne flaps. SCIA flaps can treat mild to severe lower-limb issues. Bilateral SCIA flaps repaired the penile region. This reduces donor scar pain and hides it. Both of these improve flap use. This approach is good due to these benefits.

Superficial External Pudendal Artery origins (SEPA)

In one study [34], SEA grew as a distinct trunk from FA in 70% of instances, a common stem with SEPA in 15%, and a common stem with SCIA in 15%. In 15% of cases, SEA branched off from SCIA. In 32 cases, the SEA emerged from the FA as a trunk [35]. In the remaining 8 cases, the SCIA, SEPA, and deep circumflex iliac artery formed a trunk. Four SEAs were missing. Another study [36] indicated that the SEA came from the femoral artery as a separate trunk 57.9% of the time, as a common stem with the SCIA 18.4%, as CT with SEPA 5.3%, as CT with the superficial femoral artery 13.2%, and as missing 5.2%. In addition, [37] discovered that the SEA originated in 47.5% of patients from the femoral artery, the FA in 35%, the CT with SCIA in 10%, and the common trunk with other arteries in 7.5%.

In 52 of 60 cases (92%), the Superficial Epigastric Artery (SEA) came from the femoral artery as a distinct trunk, while in 8 cases, it came as a single trunk with the Superficial External Pudendal Artery (SEPA). The percentages reflect how often the SEA began as a distinct branch or a branch of the femoral artery. For information, the lower limbs were sliced open. This investigation found 12% SEPA origin, the same as studies 38 and 39, which found 10% and 15%, respectively.

SEA flaps can be utilised as pedicled flaps for upper and lower extremity reconstruction or fasciocutaneous flaps for head and neck reconstruction or hemifacial atrophy treatment to cover a lot of skin. Recently, SEA flaps have been employed to reconstruct breasts. SEA flaps preserve abdominal muscle and fascial tissues. Flaps employ lower abdomen tissue's unique features.

Superficial External Pudendal Artery origins (SEPA)

Many international sources [16–25] believe the DEPA originated in the middle of the FA. A study [17] shown that DEPA derives from the FA near its origin. Another study [18] found that DEPA leaves the FA and goes towards the midline of the body to nourish the skin of the external genitalia. That study's findings. In another investigation [19], the DEPA originated below the saphenous aperture and the SEPA above. SEPA was above saphenous opening. In [20], it was noted that the DEPA started 5 cm lower than the MIP. The DEPA starts on the medial side of the FA 96% of the time and on the anterior medial side 4%. [21].

The deep external pudendal artery (DEPA) originated on the medial side of the femoral artery and proceeded towards the external genitalia in all sixty specimens. Researchers observed that the DEPA travelled down the centre of the body to the external genitalia. After disassembling and microscopy, this was found. This study found no differences between samples. Four times, the DEPA started its distal and middle trips from the FA. Also in the other two cases.

A total hip replacement adductor tenotomy can injure the lateral femoral epicondyle (DEPA). Thin artery walls can cause fatal issues. To avoid issues, it's crucial to grasp DEPA's history.

IV. Conclusion:

There are differences regarding the origin of the FA, SCIA, SEA, SEPA and DEPA. This research will be helpful to surgeons and orthopedists performing femoral surgery. It will also be valuable to radiologists for image interpretation and to doctors before interventional procedures are performed.

Conflict of interest:

None declared.

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