

the junction of the condyles with the femur. They are rather circumflex in their course, and have branches supplying structures entirely above the seat of operation. Hence, if the popliteal is ligated just below the point of their origin, they are liable, as in the above case, to afford a channel through which sufficient blood may flow to prevent the formation of the clot necessary to the occlusion of the artery. In the above case, however, I think that the danger from this source was considerably increased by the free collateral circulation consequent upon the previous obliteration of the femoral artery. But in another amputation through the femoral condyles, I should certainly bear in mind this source of secondary hemorrhage, and try to ligate the popliteal above the point of origin of the articular arteries.

ARTICLE XV.

SOME RARE AND NEW ANOMALIES IN MAN: WITH THREE CASES OF DOUBLE FEMORAL ARTERY. By HOWARD A. KELLY, of Philadelphia.

My notes taken in the dissecting-room for four years have repeatedly illustrated the observation, commonly made as to rarities of all kinds, that they never come singly, as the following four cases of supra-scapular artery arising from the axillary, three cases of double femoral, and numerous others in my note-book, will show.

Supra-scapular Artery coming from the First Part of the Axillary.—In about three hundred arms I have found this rare anomaly four times, occurring then on both sides of two white male subjects, in the dissecting-room of the Jefferson Medical College of this city. Both cases were observed within one week, and in each there were differences and details of arrangement of special interest, hitherto unnoticed.

CASE I. White man, slight, of moderate muscular development. Right arm, subclavian artery large, pierces the scalenus anticus muscle. Transversalis colli comes off the third part, and passes between the cords of the brachial plexus to its usual distribution. One-half inch below the border of the first rib, a large supra-scapular artery comes off the convexity of the axillary; it then passes back under what is left of the cord of the fifth and sixth cervical nerves, after they have formed the musculo-spiral, and joining the supra-scapular nerve, from the plexus two inches higher up, passes with it under the transverse ligament, the nerve *beneath* the artery. The artery gives off two branches to the sub-scapularis muscle, about one-half inch before reaching the ligament. On the left side this artery came off the axillary one-quarter of an inch below the border of the first rib, and, *mutatis mutandis*, was distributed *precisely* as its fellow.

CASE II. A white man, of moderate size and development. In the left arm the transversalis colli came from the third part of the subclavian, and was distributed as before, and one-quarter inch below the lower border of

the first rib, from the convexity of the axillary, arose the supra-scapular, whose course, distribution, and relations were precisely those of Case I. The right arm was similar, with the exception of there being no muscular branch to the subscapularis muscle, and the presence of a large branch to the trapezius muscle.

In five hundred and six cases Quain saw this anomaly occurring twice on the same subject, and his picture of the right arm shows the artery giving off two muscular branches to the subscapularis muscle, and passing under the transverse ligament. The nerves are not figured.¹

The other reference I have found is J. Bankart *et al.*, *Guy's Hosp. Rep.*, xiv., 3d Ser., 1869, p. 446, which is, in full, "the supra-scapular was in one case observed to arise from the first portion of the axillary."

I believe that these are the only cases recorded, making, with my own, seven in all.

In hunting for this anomaly I have been several times misled by a similar branch arising from the axillary, just below the first rib, but which upon further dissection was found to terminate in the subscapularis muscle.

The Middle Sacral Artery arising from the Bifurcation of a Common Trunk of the Fourth Lumbar Arteries.—I have seen this anomaly twice in the dissecting rooms of the University of Pennsylvania.

In the first case, in a white man, the right and left lumbar came off a common trunk, one-quarter of an inch long, from the posterior surface of the aorta, and one-half inch above its division into the common iliacs; and from the bifurcation of these lumbar, as ordinarily from the aorta, arose the middle sacral artery, which, after passing to the left around the promontory of the sacrum, resumed its normal position opposite to the second sacral body. In the second case, in a negro, there were five common trunks for as many right and left lumbar arteries, and from the fifth arose the middle sacral, as in the first instance; but it then passed straight on down in the median line as normally.

According to Krause, in *Henle's Handbuch der Gefässlehre*, the following from Theile sums up all the anomalous relations described as existing between the median sacral and last lumbar arteries. *Encyclop Anat.*, tome iii.; *Traité de Myol. et d'Angéiologie*, par F. G. Theile; trad. par Jourdan, Paris, 1843, pp. 528-29.

"*Middle Sacral Artery.*—It may originate in common with the last aortic lumbar, or, as I saw in one case, both of the last lumbar, from the two sides, and make a common trunk, from the left branch of which originates the middle sacral; or (according to Haller) sometimes even from the right branch."

Anomalous Pronator Radii Teres.—In a well-developed left forearm, of a white man, the palmaris longus was observed to be absent, and the pronator radii teres to arise by a head from the inner condyle, by a coronoid head, between which and the first passes the median nerve, and by a flat tendinous head, from the coronoid process lower down, which passes beneath the ulnar artery, to join the rest of the muscle near its insertion.

¹ Quain, Plate xxiv., fig. 7.

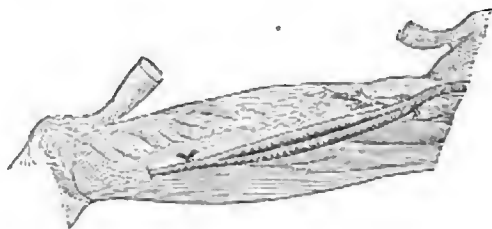
Prof. Macalister has observed this once (Catalogue of the principal muscular anomalies hitherto published [1871]. *Irish Acad. Trans.*, xxv. 1872, p. 84.

"A double coronoid head, the second lying posterior to the artery: this I met with in 1868. Mr. Kelly has informed me that he met with another instance of this in 1870, both heads lying posterior to the median nerve."

Double Femoral Artery.—The rarity, and yet the practical importance, of this anomaly is well known to every surgeon. My notes furnish three cases.

CASE I. was in the right leg of a white male subject, dissected by Dr. Crozer Griffith, at the University of Pennsylvania. The profunda came off about normally, and about four and a half inches below Poupart's ligament; the femoral artery divided into two slightly unequal branches, the inner being the larger, and these, diverging somewhat, reunited just above the canal in the adductor magnus, forming an islet of about three and a half inches in length. The anastomotica magna came off just below the point of union.

CASE II. (see figure) occurred in the dissecting-room of the Jefferson



Double femoral artery.

Medical College, this winter, in the right leg of a slight and poorly developed white woman. A femoral artery of normal size gave off from its outer side, two inches below Poupart's ligament, the profunda, which hugged close to its side, and divided into its usual branches. One-half inch below the profunda, and two and a half below Poupart's ligament, the femoral artery divided into two equal branches, which then continued close together down the thigh, in the proper position of the single artery, and reunited seven and three-eighths inches below, just above the canal in the adductor magnus. The anastomotica magna was given off immediately below the point of reunion.

Another case, which I have not yet examined personally, I have the privilege of reporting through the kindness of Dr. J. Ewing Mears:—

CASE III. A white man, of about twenty-five years of age, was admitted to the St. Mary's Hospital early in August last, for punctured wound of the thigh, involving the femoral artery. On account of the hemorrhage Dr. Mears cut down on the artery, and ligated the proximal end in the afternoon. Late that same night a violent secondary hemorrhage occurred, when the wound was opened and packed, and at last Monsell's solution used. The man died some days afterwards as a result of subsequent hemorrhages, purulent discharges, and hectic. Dr. Mears being absent from the city at the time, the resident physician examined the condition of the arteries,

above the ligature, and found the profunda coming off above Poupart's ligament, and immediately below, the femoral dividing into two equal branches, in separate compartments, one lying more superficial than the other; it was this outer branch which had been ligated. I cannot say whether they reunited, as usual, as I have not yet had the opportunity of dissecting the lower part of the limb, which has been preserved intact.

I find references to the following seven cases of this remarkable anomaly: 1st. Ch. Bell, *Lond. Med. and Phys. Journ.*, vol. vi. 1826. *Dublin Hosp. Rep.*, 1827, iv. 2d. Huston, *Dublin Hosp. Rep.*, 1827, iv. 314. 3d. Tyrrell's case in *Quain*, 1844, p. 515. 4th. *Quain*, 1844, Plate lxxi., fig. 2. 5th. Tiedemann, 1846, taf. li., fig. 1, oder fig. 2 der Explicat. 6th. Tiedemann, 1846. Explicat, p. 108. 7th. Chrétien, *Mém. Soc. de Méd. de Nancy*, 1880, pp. liii.-lx. Chrétien's paper I have not yet seen.

Of great interest in this connection is the following extract from Casamayor's *Essai sur l'Artère fémorale*, Juilliet, 1825. *Thèses de l'École de Médecine*, Paris, 1825, 5, p. 42, written before any case had been recorded:—

“As the brachial artery sometimes divides close to the axilla, into radial and ulnar, it has been judged that the same would occur in the femoral, that it would divide sometimes close to the groin into two trunks, which from thence would pass down together to the upper part of the leg.”

He then explains that the observations of Heister and Gooch, that they had seen it when amputating, were worthless, not being based upon dissections, and, probably, being nothing more than a strongly developed profunda. Bell's case, the first of which any published description was given, was as follows:—

“A negro, admitted to the Middlesex Hospital for aneurism of the popliteal artery of the left leg.” Mr. Bell tied the femoral artery low down. “The pulsation of the tumour ceased for a few seconds, but soon returned nearly as distinct as before the operation.” The patient died on the sixth day from erysipelatous inflammation of the wound; “on dissection it was found just below the part where the profunda was given off, that the femoral artery was divided into two nearly equal branches; these ran parallel to each other to the part where the artery passes through the triceps muscle; here they reunited. The ligature was found on the more superficial artery, a little above this reunion.”

A practical point of value in this case was the observation, made by Mr. Bell previous to operation, that pressure high up completely controlled the pulsation, while pressure low down did not. The anomaly here was not the cause of death, while it certainly caused the fatal issue in Dr. Mears's patient, as above reported.

Huston's case occurred in the left femoral artery of “an elderly woman.” The profunda came off an inch and a half below Poupart's ligament, and passed directly back of the femoral artery. About one-half inch below the profunda, the femoral divided into two branches, the external being somewhat the larger; these lay together in the same plane, and reunited at the opening in the triceps. The inner of these branches gave off a small muscular branch, and the outer two

muscular branches and the *anastomotica magna*. The third case, that of Tyrrell, is merely mentioned by Quain, 1844, p. 515, as occurring in a mature fœtus.

The fourth case is figured, life-size, by Quain. In the right leg the profunda comes off one inch and a half below Poupart's ligament, and about one and three-eighths inches below the profunda the femoral bifurcates, forming an islet five and three-fourths inches long. Two muscular branches come off the outer trunk.

Through the kindness of Prof. Tiedemann's son, Dr. Tiedemann, of this city, I have consulted his plate of the fifth case, in the left leg of a man of forty.

The profunda comes off two inches below Poupart's ligament, and immediately below this the femoral divides into two trunks equal in size, which, after running close together, reunite six and a half inches below. The inner gives off two muscular branches.

How Henle (*Handb. der Gefäss.*, 2d Auf. 1876, s. 311) includes this with the fourth case, figured by Quain, I cannot imagine, as they are on different legs, and differ in their measurements and muscular branches.

I extract the following brief notice of the sixth case from Tiedemann, 1846, explic., p. 109; after describing the last, which is figured life-size, he says: "I saw a similar case in the Museum of Pathological Anatomy of St. Bartholomew's in London." Can this be Quain's case?

The case recorded by Ducachet (*Amer. Med. Times*, March, 1863) is so imperfectly described that it is impossible to say positively in what category it belongs.

In amputation (he does not state at what place) for a shell wound of the knee, two arteries were seen beating in the flap about two inches apart. Upon a post-mortem examination the profunda was found as usual, and the femoral divided below Poupart's ligament. It is not known whether these branches reunited, and, in their wide separation of two inches, as seen in the flap, they differ from all the other recorded cases.

The seven cases above referred to, with the descriptions of my own three cases, make ten in all observed and recorded up to the present time.