The incidence and location of corona mortis

A study on 75 cadavers

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Submitted 03-03-28. Accepted 03-07-01

ABSTRACT We dissected 150 fresh cadaver halves by ilioinguinal exposure, and counted all vessels more than 2 mm in diameter, connecting the obturator system to the external iliac system. The distance between the symphysis pubis and the anastomotic vessels was measured. We found vascular anastomoses between the obturator and external iliac systems in 91 of 150 sides (61%), and anastomotic veins in 78 of 150 exposures (52%). Arterial connections were seen in 29 of the exposures (19%). The mean distance between the anastomotic arteries and the symphysis pubis was 64 (45–90) mm, and 56 (37–80) mm for the communicating veins. There seemed to be no significant difference between genders in the incidence of corona mortis and the distance between communicating vessels and the symphysis pubis.

The corona mortis, a potential communication between the internal and external iliac systems, should measure 2 mm or more and although this connection is usually regarded as arterial, it may be arterial or venous or both (Teague et al. 1996, Tornetta et al. 1996). The incidence of arterial connections has been estimated as 8%–43% (Teague et al. 1996, Berberoglu et al. 2001).

We studied the incidence and location of the corona mortis and its variations in the retropubic anastomotic vessels.

Material and methods

We did bilateral ilioinguinal dissections on 75 (58 male) fresh cadavers having an average age of 40 (16–78) years. There was no history of a major trauma at the time of necropsy. The medial and middle windows of the ilioinguinal approach were performed, as described by Letournel (1993). Attention was paid to the retropubic vascular anatomy and the soft tissues on each side to detect the presence of any vessel traversing the superior pubic ramus (Figures 1, 2 and 3). Vessels that measured more than 2 mm in diameter, which connected the obturator and external iliac systems, were noted as

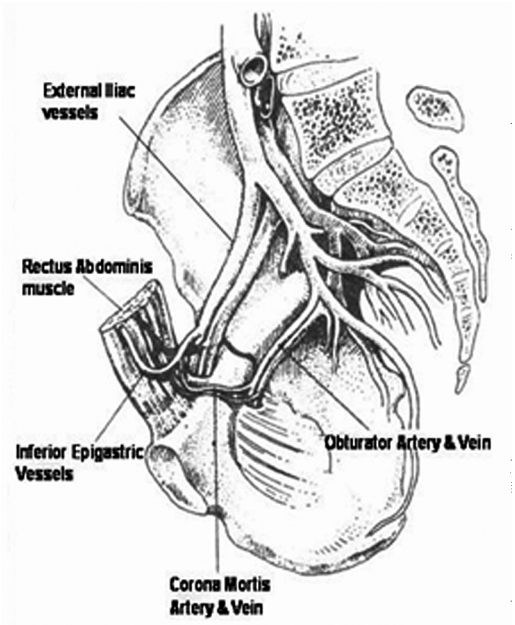

Figure 1. Schematic drawing showing the corona mortis artery and vein.

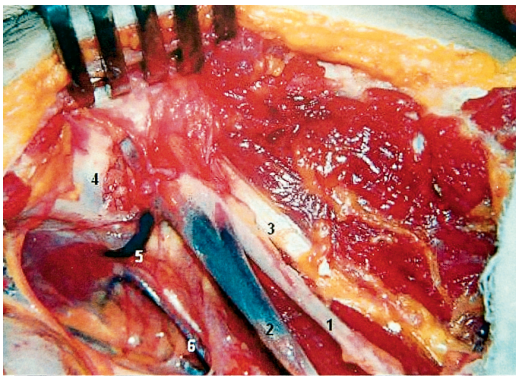

Figure 2. Cadaveric dissection showing a venous connection traversing the superior ramus.
1. External iliac artery
2. External iliac vein
3. Femoral nerve
4. Superior ramus
5. Venous corona mortis
6. Obturator vein

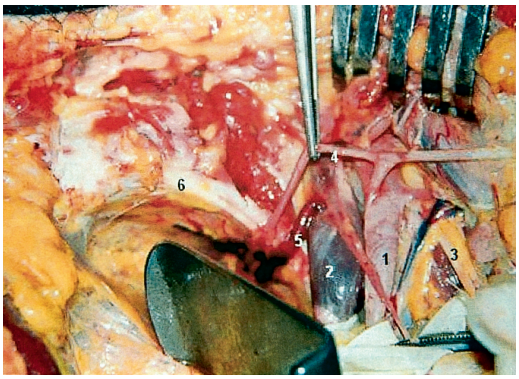

Figure 3. Cadaveric dissection viewed from the cranial aspect showing an arterial and a venous connection traversing the superior ramus.
1. External iliac artery
2. External iliac vein
3. Femoral nerve
4. Arterial corona mortis
5. Venous corona mortis
6. Superior ramus

arterial, venous or both. After the identification of all vessels, we measured the distance of each from the symphysis pubis with an electronic ruler. The findings were recorded and photographs taken. The chi-Square test was used to compare the incidence of arterial and venous connections between males and females, and the unpaired t-test to compare the distances between the symphysis and the anastomosis in men and women. The level of significant difference used was $p < 0.05$.

Number of retropubic anastomoses in 150 cadaveric dissections

Anastomosis	Number
Any vessel	91 (61%)
Venous	78 (52 %)
One isolated venous	53 (35%)
Several venous	9 (6%)
Arterial	29 (19%)
One isolated arterial	12 (8%)
Two arterial	1 (1%)
Both venous and arterial	13 (9%)
2 venous and an arterial	3 (2%)

Results

We found a vascular communication in 91 (61%) cadaver sides. Venous anastomoses were much commoner. 78 sides (52%) had venous connections. Arterial connections were found in 29 cases (19%) (Table).

21 of 75 pelvises had bilateral vascular connections, but only 9 had bilateral mirror image vascular trees.

A vascular connection was seen in 70 sides of 58 male specimens and in 21 sides of 17 female specimens. Venous connections were found in 36 male specimens, a rate of 0.6 (95% CI 0.5–0.7%) and in 11 female specimens, rate 0.7 (95% CI 0.4–0.8%, $p = 0.8$).

Arterial anastomoses were seen in 16 male specimens, rate 0.3 (95% CI 02.–0.4%) and in 3 female specimens, rate 0.2 (95% CI 0.05–0.4%, $p = 0.4$). The average distance of the arterial anastomoses from the symphysis pubis was 64 (45–90) mm and 56 (37–80) mm for the communicating veins. We found no statistically significant differences between the genders.

Discussion

Vascular connections between the external iliac and obturator systems are called the corona mortis (Figure 1). These connections may be arterial, venous or both. With the increase in surgery of the anterior pelvic ring, many investigators have started to study the detailed anatomy of the retro-

pubic vascular system (Teague et al. 1996, Tornetta et al. 1996, Berberoglu et al. 2001, Karakurt et al. 2002). These authors have noted the variations in the corona mortis, and estimated the incidence and location.

We planned our study to evaluate not only the incidence and location of communicating vascular channels running over the superior pubic ramus, but also to determine the differences between males and females. To our knowledge, only one study has reported the incidence of the arterial corona mortis in males and females (Karakurt et al. 2002), authors have studied the incidence and location of the venous corona mortis.

The incidence of communicating vascular channels has been reported to be 96% by Berberoglu et al. (2001), 73% by Teague et al. (1996), and 84% by Tornetta et al. (1996). We found an incidence of 61%. Berberoglu et al. (2001) reported an incidence of arterial corona mortis of 8% in 50 retroinguinal dissections, while Teague et al. (1996) found one of 43% in 79 cadaveric halves, and Karakurt et al. (2002), in their angiographic study, noted an arterial incidence of 29%, but they failed to mention the number of arteries. According to Letournel (1993), the incidence was 10%–15%, but clinically, he encountered only one very large vessel in more than 150 ilioinguinal exposures. He also noted that the type of fracture probably affected the anastomoses, by lacerating these vascular connections at the time of injury (Letournel and Judet 1993). Teague et al. (1996), in their clinical report, were of the same opinion. In our study, incidence of arterial corona mortis was 19%, and in those of Berberoglu et al. (2001) the incidence of venous corona mortis was 96%, of Tornetta et al. (1996) 70%, of Teague et al. (1996) 59%, and in ours 52%. The great variation of reported incidences may be due to:

1. Regional differences in the development of the vascular system.

2. Difficulties in dissecting the collapsed vessels in cadavers and the limitations caused by the size of the vessels.

We excluded vessels smaller than 2 mm in diameter because we wanted to include vessels of relevant size. We performed most of the dissections within 12 hours of the postmortem when the vessels were still filled with blood.

So far as we know, only Karakurt et al. (2002) estimated the incidence of the arterial corona mortis in males (31%) and females (26%).

Tornetta et al. (1996) found that the average distance of anastomotic vessels from the symphysis pubis was 62 (SD 12) mm, but they did not mention anything about the type of vessels. Unlike us, Karakurt et al. (2002), in their angiographic study, found a significant difference between men and women in the average distance of anastomotic arteries from the symphysis—i.e., 32 mm in men and 36 mm in women—but they failed to state how they measured the distance on angiographic images. And the way they calculated the magnification on the radiographs.

No competing interests declared.

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