นิพนธ์ต้นฉบับ ▪ Original Article

ความชุกของโคโรนามอร์ทิส ในร่างอาจารย์ใหญ่แบบสดในแถบภาคตะวันออกเฉียงเหนือ และบริเวณที่ปลอดภัยสำหรับการผ่าตัดไส้เลื่อน

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The Prevalence of Corona Mortis in North-Eastern Thai Fresh Cadavers and the Safety Zone for Herniorrhaphy

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หลักการและวัตถุประสงค์: โคโรนามอร์ทิส (corona mortis) คือการเชื่อมของหลอดเลือดระหว่างเอ็กเทอนอล (external) และอินเทอนอล (internal) ของระบบอิลิแอก (iliac system) ซึ่งความหลากหลายทางกายวิภาคนี้มีบทบาทสำคัญในทางคลินิกและการผ่าตัด เนื่องจากอาจเป็นอันตรายถึงชีวิตในระหว่างการผ่าตัดไส้เลื่อนหรือขั้นตอนการผ่าตัดอื่นๆ ของเชิงกราน (pelvis) และอะเซตาบูลัม (acetabulum) มีหลายการศึกษารายงานถึงอุบัติการณ์ของโคโรนามอร์ทิสและระยะห่างระหว่างโคโรนามอร์ทิสถึงพิวบิสซิมฟายซิส (symphysis pubis) แต่อย่างไรก็ตาม ข้อมูลเกี่ยวกับระยะห่างทางกายวิภาคระหว่างโคโรนามอร์ทิสถึงพิวบิคทูเบอเคิล (pubic tubercle) นั้นยังมีน้อย พิวบิคทูเบอเคิลเป็นตำแหน่งอ้างอิงที่สำคัญสำหรับบริเวณที่ผ่าตัดไส้เลื่อน การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อสำรวจความชุกของโคโรนามอร์ทิสและระยะห่างระหว่างโคโรนามอร์ทิสถึงพิวบิคทูเบอเคิลในร่างอาจารย์ใหญ่แบบสดในแถบภาคตะวันออกเฉียงเหนือ

วิธีการศึกษา: ทำการศึกษาร่างอาจารย์ใหญ่แบบสดในแถบภาคตะวันออกเฉียงเหนือ 20 ร่าง จำนวนเชิงกราน 40 ข้าง โดยการผ่าเพื่อสำรวจโคโรนามอร์ทิสทั้งแบบหลอดเลือดแดง หลอดเลือดดำ หรือทั้งสองแบบ ทำการวัดระยะห่างระหว่างโคโรนามอร์ทิสและพิวบิคทูเบอเคิล

ผลการศึกษา: ผลสำรวจพบว่าโคโรนามอร์ทิสทั้งแบบหลอดเลือดแดงและหลอดเลือดดำมี 60% โดยพบอุบัติการณ์ของโคโรนามอร์ทิสในเพศชาย (75% ของช่องเชิงกราน 28 ข้าง) มากกว่าในเพศหญิง (25 % ของช่องเชิงกราน 12 ข้าง) ซึ่งความชุกของโคโรนามอร์ทิสมีเท่ากันและพบอีกว่าระยะห่างจากโคโรนามอร์ทิสถึงพิวบิคทูเบอเคิลอยู่ในช่วง 2.21-4.50 เซนติเมตร

Background and Objective: Corona mortis is a collateral circulation between the external and internal iliac system. This anatomical variant plays an important role in clinical and surgical procedure since it may cause life threatening during hernia repairs or other surgical procedures of the pubis and acetabulum. Several studies reported the incidence of corona mortis and its distance to symphysis pubis, however, little information regarding the distance from this anatomical variant to pubic tubercle, important landmark for a herniorrhaphy incision area. This study aimed to investigate the incidence of corona mortis and its distance to pubic tubercle in North-eastern Thais fresh cadavers.

Methods: Twenty North-eastern Thais fresh cadavers, 40 hemipelvises were dissected to explore arterial and venous corona mortis or both. The distance between corona mortis and pubic tubercle was measured.

Results: Arterial-venous or both corona mortis were present 60%. The incidence of corona mortis in male (75% of 28 hemipelvises) was greater than those in female (25 % of 12 hemipelvises). The prevalence side of corona mortis was equally found. Subsequently, the distance from corona mortis to the pubic tubercle was ranged from 2.21-4.50 cm.

Conclusion: In conclusion, the high prevalence of

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สรุป: กล่าวสรุปคือพบความชุกของโคโรนามอร์ทิสค่อนข้างสูงในร่างอาจารย์ใหญ่แบบสดในแถบภาคตะวันออกเฉียงเหนือ ซึ่งอธิบายจากช่องเชิงกรานจำนวณ 40 ข้าง จากการศึกษานี้เราอาจแนะนำตำแหน่งที่ปลอดภัยสำหรับบริเวณที่ผ่าตัดไส้เลื่อนแบบเปิด โดยควรทำได้ในระยะที่น้อยกว่า 2.21 เซนติเมตร จากตำแหน่งพิวบิคทูเบอเคิล

คำสำคัญ: โคโรนามอร์ทิส, การผ่าตัดไส้เลื่อน, ร่างอาจารย์ใหญ่แบบสด, พิวบิคทูเบอเคิล

corona mortis in fresh Thai cadavers was demonstrated. We could suggest that the safety zone for an incision area in open herniorrhaphy could be less than 2.21 cm from pubic tubercle.

Keywords: corona mortis, herniorrhaphy, fresh cadavers, pubic tubercle

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Introduction

A hernia is a condition that there is a protrusion of an organ or part of an organ through the body wall that normally contains it[1]. Almost all cases of hernias with symptoms that affected daily life need surgical repairs. Available evidence indicated that groin hernia repair has been operated in more than 20 million patients annually worldwide[2]. It is well established that there are two main recommended methods for inguinal hernia repairs including; conventional open hernia repair (herniorrhaphy) or laparoscopic hernia repair (hernioplasty)[3]. Suture-and mesh-based techniques are advocated since these procedures can be either open or minimally invasive[4]. Available open hernia methods have been categorized such as (1) tissue approximation repair (Bassini, Shouldice, McVay) and (2) open tension-free prosthetic repair, placing mesh in front of the transversalis fascia (Lichtenstein open tension-free hernioplasty) or behind it (Nyhus/ Condon, Rives, Read, Stoppa, Wantz, and Kugel procedures)[5]. These procedures may cause several serious complications such as hemorrhage, hematoma, seroma, infection, recurrent hernia[6] and postoperative neuropathic pain[7]. Subsequently, life-threatening hemorrhage resulting from accidentally cutting an anatomical variation of vessel in inguinal region during hernia repair has been concerned[8].

The corona mortis or crown of death is an anatomical variation where there is a connection between the obturator and the external iliac or inferior epigastric arteries or veins[9]. Several lines of evidence reported the incidence and location of corona mortis in the different populations. Karakurt and coworkers reported in Turkey patients as they found 28.5% of arterial anastomosis with 30.5% in men and 25.6% in women. In addition, the distance from the symphysis pubis to the anastomotic artery was averaged 3.34 cm[10]. Talalwah (2016) found 12% of Austrian population exhibited the corona mortis[11]. In British 80-cadaver dissections, an vascular anastomosis was present in 83% of specimens[12]. In clinical practice, it is difficult to stop troublesome bleeding, if surgeons accidentally cut the collateral branch in inguinal regions. Especially, for a McVay procedure that transition suture included the transversus abdominis, Cooper's ligament, and femoral sheath with one suture[13]. Thus, the surgeon must be aware of the anastomoses of arteries and vein in this region[9]. Furthermore, public tubercle is an important landmark for location of hernia and incision[13, 14]. In Thailand, little information regarding the incidence and location of corona mortis has been revealed. The present study aimed to provide a comprehensive evidence-based incidence of corona mortis and further measure the distance of this variation and pubic tubercle in North-eastern Thais fresh cadavers.

Materials and Methods

Forty fresh cadaver halves of 20 fresh cadavers (14 male; 6 female) from the department of Anatomy, faculty of Medicine, Khon Kaen university were dissected in the present study. The dissection at the ilioinguinal region was applied regarding the McVay inguinal hernia repair technique to determine the occurrence of the corona mortis and its distance from the pubic tubercle. After completion of the dissection all vessels either artery or vein were identified and the distance between the pubic tubercle and the corona mortis was measured (Figure 1). The type of corona mortis is shown in Figure 2. Data were expressed as median and the interquartile range (IQR). This study was approved by Ethics Committee on Human Specimens Research of Faculty of Medicine, Khon Kaen University, Thailand (HE621024).

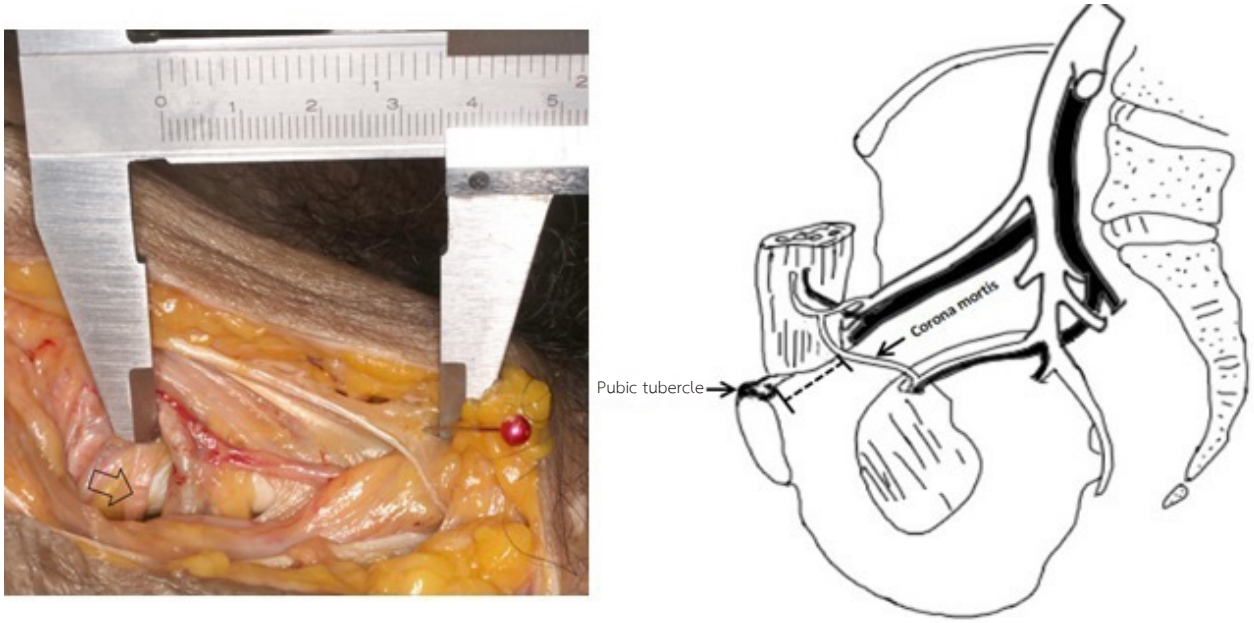

Figure 1 Shows a vernier calipers being used to measure the distance between the right pubic tubercle (red pin) and the corona mortis (arrow) (left) and drawing picture of corona mortis and pubic tubercle (right)

Table 1 The prevalence of corona mortis by gender, types and sides

Types of corona mortis	Side	Male [n=14 (%)]	Female [n=6 (%)]	Total [n=20 (%)]
Artery	Right	4 (28.57)	0 (0)	4 (20)
	Left	2 (14.28)	2 (33.33)	4 (20)
Vein	Right	6 (42.85)	1 (16.66)	7 (35)
	Left	7 (50)	0 (0)	7 (35)
Both artery and vein	Right	1 (7.14)	0 (0)	1 (5)
	Left	1 (7.14)	0 (0)	1 (5)

Of the 40 hemipelvises, the incidence of corona mortis was indicated by gender, types and side (Table1). It was found that the incidence of corona mortis in male was greater than those in female, 28 of 40 hemipelvises (75%) VS 3 of 12 hemipelvises (25 %). The prevalence side of corona mortis was equally found. Subsequently, the distance from corona mortis to the pubic tubercle was ranged from 2.21-4.50 cm and the distance value was summarized as median and the interquartile range (IQR) in Table 2.

Table 2 Mean distance from the vessel to pubic tubercle (cm)

Median Side of corona mortis	Male	Female
Right		
Artery	3.30 (IQR=0.69) (n=4)	
Vien	3.59 (IQR=1.47)(n=4)	3.36 (n=1)
Left		
Artery	3.79 (n=2)	3.24(n=2)
Vien	3.27 (IQR=1.16) (n=6)	

Discussion

The present study demonstrated the incidence of corona mortis (arterial, venous or both) in North-eastern Thais fresh cadavers was 60 %. This finding was consistent with several previous studies

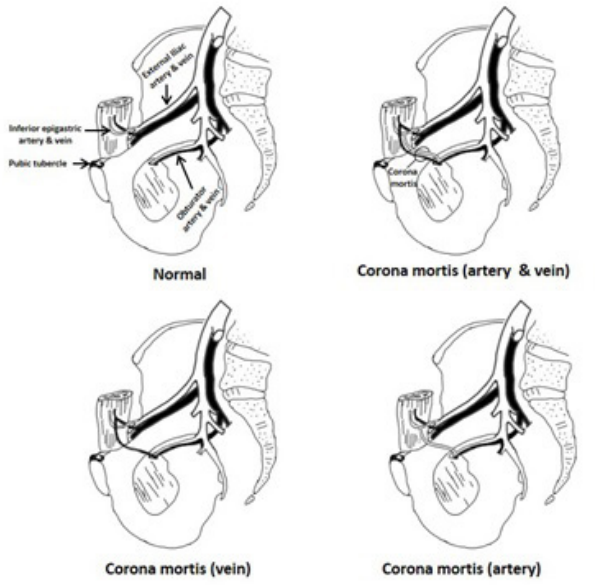

Figure 2 Shows types of corona mortis. In this study the anatomical variation is a connection between the obturator system and the inferior epigastric system

that the incidence of corona mortis was ranging from 45, 73, 84, 89-90 %[15-19]. In a meta-analysis of the prevalence and morphology of the corona mortis reported that it is more common in Asia population (59.3%) than in European population (42.8%) and North American (44.3%)[20]. Additionally, we found that venous corona mortis is usually higher frequency than the arterial one. This was similar with the finding of Pellegrino and coworkers (2014)[21]. These substantial numbers of corona mortis findings should draw the surgeon attention to aware during the pelvic operation.

The distance from pubic tubercle to anastomotic vessels has an important anastomotic value for surgeons to consider the safe zone of the incision area during open herniorrhaphy. This study found the distance form corona mortis to pubic tubercle was ranged from 2.21-4.50 cm. Most previous studies reported the average distance of anastomosis vessel from the symphysis pubis, ranging from 3.4-7.1 cm[19, 22-26]. Since pubic tubercle is more laterally from midline than the symphysis pubis, the distance value found in this study is less than those previous studies. Pubic tubercle, however, is an important landmark for incision area of open herniorrhaphy. This study provided the data for safety zone of an incision point for open herniorrhaphy that should be less than 2.21 cm from pubic tubercle.

In conclusion, the finding of this study showed the prevalence (60% of 40 hemipelvises) of corona mortis in North-eastern Thai fresh cadavers, 40 hemipelvises and provided the distance (ranged 2.21-4.50) from pubic tubercle to corona mortis. This distance value is likely to suggest as the safety zone for an incision area in open herniorrhaphy.

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