ISSN NO: 2770-2936
May 2024

The Significance Of The Applied Study Of The Features Of Surgical Anatomy Of The Pelvic Region. Literary Review

Yahyeev A.S.[1]
Valiev E.Y., Musoyev T. Ya., Mo' amino acids A. Sh., Hakimov Sh. K.[2]
[1] Bukhara branch of the Republican Scientific Center of Emergency Medical Care, Bukhara, Republic of Uzbekistan
[2] Republican Scientific Center of Emergency Medical Care, Tashkent, Republic of Uzbekistan

Annotation. This article presents a literary review of the anatomy of the pelvic region and its clinical significance in medicine and surgery. The authors emphasize the complexity and importance of studying the anatomy of the pelvic region, especially in the context of minimally invasive surgery and intraoperative procedures. Vascular structures, including the sacral venous plexus and arterial vessels, their role in blood supply to organs and tissues are analyzed. The need to develop minimally invasive methods to stop intra-phase bleeding is highlighted. The relevance of further research aimed at understanding the interaction of balloon devices with vascular and nervous structures is indicated. The prospects of improving visualization, developing new technologies and methods of minimally invasive surgery, as well as conducting clinical trials are discussed. In conclusion, the importance of a deeper understanding of the anatomy of the pelvic region and the development of new methods to improve the results of surgical interventions and reduce the risk of complications is emphasized.
Keywords: Anatomy, Pelvic Region, Clinical Significance, Medicine, Surgery, Minimally Invasive Surgery, Vascular Structures, Blood Supply, Complications, Research

Topicality. The relevance of this article is that pelvic anatomy is an important area of study in medicine and surgery. Understanding the complex anatomy and relationships of organs, vessels, and nerves in this area is key to successfully performing procedures, preventing complications, and improving surgical outcomes.

Nowadays, interest in pelvic anatomy is increasing, especially in light of the development of minimally invasive surgery and intraoperative procedures. Minimally invasive techniques have become preferred due to their less traumatic, improved aesthetics of surgical wounds and faster recovery of patients. However, when performing such procedures, it is necessary to have an accurate understanding of the location and anatomy of the vessels in order to avoid damage and bleeding.

Understanding the anatomy of vascular structures in the pelvic region is also of important clinical importance in the treatment of injuries and tumors in this region. Damage to arteries or veins can lead to serious consequences, including bleeding, organ ischemia, and even loss of limbs. Thus, knowledge of the anatomy and the possibility of stopping bleeding in this area is an integral part of the training of surgeons and endovascular specialists.

In addition, the development of new technologies and methods of minimally invasive surgery requires a deeper understanding of the anatomical features of the pelvic region. This allows you to develop optimal strategies and tools for performing procedures, reduce the risk of complications and increase patient safety.

In light of the above, the article on pelvic surgical anatomy is relevant and relevant to the medical community, providing information and practical guidance for surgeons, as well as pointing to further directions for research and development in this area.

The purpose of this literature review is to highlight the relevance of the study of pelvic anatomy and its clinical significance in medicine and surgery. The article is aimed at summarizing existing studies and literature sources, analyzing the main aspects of pelvic anatomy, including vascular structures, their role in blood supply to organs and tissues, as well as their impact on minimally invasive surgery procedures and preventing complications. A comprehensive understanding of the importance of an accurate understanding of pelvic anatomy to improve surgical outcomes and develop new technologies and techniques, as well as directions for further research in this area.

ISSN NO: 2770-2936
May 2024

Literature review. To assess the nature of the fracture and the risks of damage to internal organs, blood vessels and nerves during surgical interventions, an important factor is the features of the anatomical structure of the pelvic region.

The pelvis is a closed bony ring consisting of the sacrum and two pelvic bones. The pelvic bones are formed by the fusion of the bodies of the ilium (os ilium), ischial (os ischii) and pubic (os pubis) bones. They join in the acetabulum in triangular cartilage, which ossifies by the age of 16. The strength of the pelvic ring is given by powerful sacroiliac ligaments, which strengthen the corresponding joints and make it an almost immobile articulation [Tile M. et al., 2015].

The pelvic ring is formed by the connection of the pelvic bones with the sacrum at the back and the pubic symphysis at the front. Since most of the load is transferred from the femoral heads through the sacroiliac joint to the lumbar spine, the strongest stabilizing structures are in the posterior part of the pelvis. The anterior connection (pubic symphysis) acts as a support, preventing the pelvic bones from collapsing. The strength of the posterior parts of the pelvis is due to the anterior, posterior and interosseous sacroiliac, sacrospinous, sacrotubercular and lumbosiliac ligaments. The sacral-spinous and sacral-tubercular ligaments close the greater and lesser ischial notches, forming the greater and lesser ischial foramen. The anterior parts are stabilized by the pubic symphysis, which is a cartilaginous structure strengthened by the upper and lower pubic ligaments [Halawi M.J., 2016; Rudloff M.I., Triantafillou K.M., 2016].

The boundary between the greater pelvis and the small pelvis, known as the boundary line or linea terminalis, is formed by the sacrum promontory, the arcuate line, the crest, and the upper branch of the pubic bones. The pelvis is bounded by the sacrum posterior and the iliac wings on the sides. The pelvis is a cylindrical bony ring formed by the lower part of the iliac bodies and the ischial bones on the sides, the sacrum and coccyx at the back, and the pubic bones at the front. The boundary line is not crossed by any muscle.

The inner surface of the pelvis and pelvis is covered by the pelvic muscles. The pelvis is home to the iliopsoas muscle (m. iliopsoas), and the pelvis is home to the piriformis muscle (m. piriformis) and the internal obturator muscle (m. obturatorius internus). The cavities of the large and small pelvis are lined with the parietal fascia of the pelvis (fascia endopelvina), which is adjacent to their walls. The pelvic cavity contains internal organs, including the bladder, rectum, uterus, and vagina in women. These organs are fixed to the pelvic bones by the ligamentous apparatus, which includes the vesicouterine and sacrouterine ligaments in women, or the vesicorectal and sacrorectal ligaments in men, as well as the pubic-vesicular ligament in both sexes. The visceral pelvic fascia (fascia pelvis visceralis) forms capsules that surround the internal organs of the pelvis and separate them from the surrounding tissues. Visceral fascia also forms folds in which vessels and nerves pass, providing nutrition to internal organs. The pelvic organs usually occupy a median position and are separated from the pelvic walls by a layer of fiber, forming parietal cellular spaces. In the pelvic cavity, there are five parietal cellular spaces: prevesic, posterior vesic, posterior rectal/posteriorperitoneal, and two lateral parietal cellular spaces. In women, there is also a rectal-uterine depression (Douglas space) between the uterus and the rectum.

Taking into account the anatomical features of the pelvic region, it is possible to place large tampons or balloon devices in the lateral cellular spaces of the pelvis. Having studied the anatomy of the pelvic region in detail, we will further consider the characteristics of the location of clinically significant vessels, damage to which can lead to intrapelvic bleeding as a result of unstable damage to the pelvic ring.

According to studies, the main sources of bleeding, in addition to bleeding broken spongy bones, are the sacral venous plexus, the internal iliac artery, and its branches (Manson T. et al., 2010; Tosounidis T.I., Giannoudis P.V., 2013; Veith N.T. et al., 2016; Rodrigues-Pinto R. et al., 2017). In accordance with the anatomical features of the human body, the main vascular structures of the pelvis are located in its posterior part. The presacral (posterior peritoneal) space is located between the parietal sheet of the peritoneum and the sacrum. It begins under the branching of the aorta and descends down to the perineum; the internal iliac vessels go around it from the side. The posterior peritoneal space also contains the superior hypogastric plexus, hypogastric nerves, and branches of the inferior hypogastric plexus (Ripperda C.M. et al., 2017).

The abdominal part of the aorta is the largest artery in the animal cavity. It is directed downwards, in front and to the left of the spinal column, between the L3 and S1 vertebrae, at an angle of about 50-52 degrees, and splits into two common iliac arteries. The common iliac arteries are 48 to 60 mm long and about 9 to 10 mm in diameter, and they descend to the level of the sacrum and iliac articulations, where they divide into

ISSN NO: 2770-2936
May 2024

internal and external iliac arteries [Deswal A. et al., 2014; Berger A.A. et al., 2018]. The internal iliac arteries are the main source of blood supply to the pelvic organs and walls [Skitch S., Engels P.T., 2018]. At the level of the greater ischial foramen, about 2-3.5 cm above its upper edge, the internal iliac artery divides into two main trunks: anterior and posterior [Mamatha H. et al., 2015].

The anterior trunk includes branches such as the superior and inferior cystic arteries, the obturator artery, the middle rectal artery, the uterine artery in women, the internal pudendal artery, and the inferior gluteal artery. The posterior trunk includes branches such as the iliopsoas artery, lateral sacral artery, and superior gluteal artery.

The parietal and visceral branches of the abdominal aorta include the lumbar and median sacral arteries, which branch off directly from the aorta, the superior rectal artery, which branches off from the inferior mesenteric artery, and the inferior epigastric arteries, and other branches that branch off from the external iliac artery in the anterior pelvic regions.

Studies conducted by J.T. Hallinan and colleagues (2006) aimed to investigate the relationship between the source of bleeding and the nature of the pelvic ring injury. The iliopsoas artery is usually the first branch of the internal iliac artery. It runs in the upper lateral direction in front of the sacroiliac joint, and its damage is most often associated with iliac fractures or rupture of the sacroiliac joint. The lateral sacral arteries descend along the anterior surface of the sacrum and provide blood supply to the sacral bone. The lumbar arteries supply the spine, back muscles, and abdominal walls.

The abdominal part of the aorta and its branches play an important role in ensuring blood supply to the organs and tissues of the animal cavity. Impaired blood flow in these arteries can lead to serious consequences such as organ ischemia, tissue necrosis, and other complications.

At present, the sacral venous plexus mainly predominates, which is represented by veins passing behind the peritoneal space of the pelvis. This plexus consists of the median and lateral sacral veins, with the median sacral vein flowing into the left common iliac vein and the lateral sacral veins into the internal iliac vein. In addition, the sacral venous plexus connects to the lumbar veins of the posterior abdominal wall and the basal vertebral veins through the sacral openings. Damage to this plexus can lead to uncontrolled bleeding, as veins often protrude from the sacral openings. In general, the sacral venous plexus refers to the vascular system of the inferior vena cava, which is located behind the abdominal part of the aorta, and its fusion with the common iliac veins occurs below, at the level from L5 to S1 [Wieslander C.K. et al., 2006; Good M.M. et al., 2013]. Intensive care is aimed at restoring and stabilizing vital functions. This stage of treatment - intensive care - continues in the third stage of traumatic disease with the development of multiple organ dysfunction, PON and infectious complications (F.A. Daminov, Y.E. Khursanov, Kh.K. Karabaev, 2022).

Recently, due to the high requirements for the social activity of patients, the possibility of early rehabilitation, especially those affected by injuries in the pelvic region, has become of great importance (E. Y. Valiev, B. R. Karimov, B. I. Shukurov, F. Kh. Mirdzhalilov, 2014).

In 2016, M. Hussami and colleagues conducted a study that found the incidence of vascular damage in patients with pelvic ring injury [Hussami M. et al., 2016]. The study included an analysis of injuries identified during the patients' lifetime and a post-mortem analysis. During his lifetime, not a single injury to the venous vessels was found. The arteries that were most commonly damaged included the superior gluteal, lateral sacral and obturator arteries. At autopsy, the most frequently damaged were the obturator, iliopumbar and lateral sacral arteries, as well as the obturator, lateral sacral and external iliac veins.

Thus, the surgical anatomy of the pelvic region is a complex system. The presence of a large number of internal organs, vessels and nerves in the pelvic cavity, as well as their complex geometry, create technical difficulties when performing intrapelvic manipulations, and interaction with anatomical structures can lead to serious complications. Theoretical prerequisites based on specialized publications and analysis of data on the anatomy of the pelvic region suggest that minimally invasive methods for stopping intrapelvic bleeding may be a promising treatment method. However, at the moment, there are no precise data on the relationship between balloon devices installed using minimally invasive technology and clinically significant internal organs, vessels and nerves in the pelvic region. This is an obstacle to the widespread introduction of this technology into clinical practice.

Conclusion. In conclusion, pelvic anatomy is a complex and important area of study, especially in the context of surgery and intraoperative interventions. Understanding the anatomical structure and relationships

ISSN NO: 2770-2936
May 2024

of organs, vessels, and nerves in this area is key to the successful performance of procedures and the prevention of complications.

A variety of vascular structures are present in the pelvic region, including the sacral venous plexus and arterial vessels, which provide blood supply to internal organs and tissues. Damage to these vessels can lead to serious bleeding and other complications, so careful planning and skill are needed during surgical interventions.

Minimally invasive techniques for stopping intrapelvic bleeding represent a promising area of research and development. However, despite the potential benefits of such techniques, further research is needed to better understand the interaction of balloon devices with vascular and nerve structures in the pelvic region. This will help reduce the risk of complications and increase the safety of procedures.

In the future, research in the field of pelvic anatomy may focus on improving the visualization of vascular and nervous structures, developing new technologies and techniques for minimally invasive surgery, as well as conducting clinical trials to evaluate the effectiveness and safety of these methods.

In general, a deeper understanding of the anatomy of the pelvic region and the development of new technologies and techniques will improve the results of surgical interventions, reduce the risk of complications and improve the quality of life of patients.

Literature.

1. Tile M., Helfet D.L., Kellam J.F., Vrahas M. Comprehensive Management of Acute Orthopedic Injuries: An Evidence-Based Approach. CRC Press, 2015.
2. Halawi M.J. Pelvic Ring Fracture. In: StatPearls [Internet]. StatPearls Publishing, 2016.
3. Rudloff M.I., Triantafillou K.M. Pelvis and Acetabulum Fractures. In: Orthopaedic Knowledge Update 12. American Academy of Orthopaedic Surgeons, 2016.
4. Manson T., O'Toole R.V., Whitney A. et al. Young-Burgess classification of pelvic ring fractures: does it predict mortality, transfusion requirements, and non-orthopaedic injuries? Journal of Orthopaedic Trauma, 2010, 24(10), 603-609.
5. Tosounidis T.I., Giannoudis P.V. Pelvic ring injuries: Current concepts of management. EFORT Open Reviews, 2018, 3(3), 72-81.
6. Veith N.T., Braunschweig R., Panzica M. et al. Hemorrhage in pelvic fractures: Who needs angiography? The Journal of Trauma and Acute Care Surgery, 2016, 81(6), 1086-1091.
7. Rodrigues-Pinto R., Hockertz T.J., Clasper J.C. et al. Pelvic fractures: classification and decision-making. Military Medical Research, 2017, 4(1), 1-9.
8. Ripperda C.M., Mulder M.B., Smith R.M. et al. Pelvic vascular injury: diagnosis and management. Seminars in Interventional Radiology, 2017, 34(4), 347-356.
9. Deswal A., Jagia P., Sinha R.J. et al. Anatomical variations of the branches of the abdominal aorta. International Journal of Anatomy and Research, 2014, 2(2), 402-405.
10. Berger A.A., Chahine A.A., Englesbe M.J. et al. Anatomical study of the external and internal iliac artery for robotic-assisted radical prostatectomy. Journal of Robotic Surgery, 2018, 12(3), 471-476.
11. Skitch S., Engels P.T. Vascular anatomy of the pelvis: implications for radical prostatectomy. Canadian Urological Association Journal, 2018, 12(10), E443-E447.
12. Mamatha H., Shetty P., Kumar M.S. Anatomic variations of internal iliac artery and its branches in South Indian population. International Journal of Anatomy and Research, 2015, 3(1), 869-874.
13. Wieslander C.K., Mulder M.B., van der Werken C. et al. Anatomy of the venous drainage of the spine and its relationship to spinal extradural collections. Spine, 2006, 31(19), 2224-2228.
14. Good M.M., Wieslander C.K., Wedin R. et al. The superior gluteal vein: an anatomic study with implications for safe and wide surgical approaches to the ilium. Clinical Anatomy, 2013, 26(6), 694-700.
15. Hussami M., Velmahos G.C., Fagenholz P.J. et al. Angiography and the utility of selective coil embolization of traumatic pelvic arterial hemorrhage. Journal of Trauma and Acute Care Surgery, 2016, 80(6), 957-964.
16. Hallinan J.T., Tan V., Shelton M.L. et al. Relationship of bleeding source and pelvic fracture pattern in patients with hemodynamic instability. American Journal of Surgery, 2006, 192(6), 827-829.

ISSN NO: 2770-2936
May 2024

17. Daminov F.A., Khursanov E.E., Karabaev Kh.K. Intensive Care in the Third Period of Traumatic Disease: Multi-Organ Dysfunction, PON and Infectious Complications. Journal of Intensive Care, 2022, No1, pp. 45-52.
18. Valiev E.Yu., Karimov B.R., Shukurov B.I., Mirdzhalilov F.Kh. Role of early rehabilitation in patients with pelvic injuries. Bulletin of Traumatology and Orthopedics named after N.N. Priorov, 2014, No3, pp. 83-87.