



Received: 17-02-2025
Accepted: 27-03-2025

International Journal of Advanced Multidisciplinary Research and Studies

ISSN: 2583-049X

Earliest Operative Methods of Groin Hernia: A Journey from Ancient to Medieval Age

¹ Waseem Ahmad, ² Saiyad Shah Alam, ³ Iqbal Aziz

¹ Assistant Professor, Department of Jarahat (Suregry), National Institute of Unani Medicine, Ghaziabad, India

² Professor and Head, Department of Jarahat (Surgery), National Institute of Unani Medicine, Bengaluru, India

³ Professor, Department of Jarahat (Surgery), Ajmal Khan Tibbiya College & Hospital, AMU, Aligarh, India

Corresponding Author: **Waseem Ahmad**

Abstract

Hernia is a disease in which there is a protrusion of the viscus or part of the viscus through the walls that contain it. Today, there are many advanced operative procedures for hernia repair with the principle of reducing the hernia sac back into the abdominal cavity first then strengthening the posterior wall of the inguinal canal with or without mesh implants. These procedures have been developed during the

course of time with vast research and experimentations by surgeons of different time periods. Aim of this review is to find answers to various questions like how was hernia managed in ancient times, how management methods travelled from one society to another and how those methods evolved from time to time, and how those methods became principles for advanced hernia operations.

Keywords: Groin Hernia, Greek Medicine (Unani Medicine), Cordova University, Al-Zahrawi, Guy de Chauliac

Introduction

Hernia is a disease the record of which is found in ancient Egypt dating back to 2500 B.C. Ancients Egyptians were aware of groin hernia and managed it conservatively except few who operated it. Greek physicians in the 4th Century B.C. understood this disease and its conservative managements were explained by Hippocrates and Praxagoras. Further operative procedures were developed by Galen in the 2nd Century A.D. During the passage of time, when Greek Medicine reached the hands of Arabs, they contributed to its further advancement, and a detailed operative procedure of hernia was explained by Andalusian surgeon Al-Zahrawi (Albucasis) in 10th century A.D. Guy de Chauliac, who quoted Al-Zahrawi about two hundred times in the book "Chirurgia Magna" gave various operative procedures of hernia. Procedures given by Al Zahrawi and Guy de Chauliac remained in practice for the next 400 years until a clear understanding of abdominal layers and the inguinal canal.

Ancient Egypt

There are pieces of evidence that Egyptians were the first to have knowledge about hernia. The tomb of Ankhmohar at Saqqara in Egypt dating back to 2500 B.C. includes an illustrated sculpture where an operator performs circumcision and possibly reduction of groin hernia ^[1]. Then the earliest recorded description of hernia has been found in George Eber's papyrus dating back to 1500 B.C ^[2]. In this papyrus, a hernia was described as a swelling that appears on coughing ^[3]. Ebell's study of papyrus suggested that ancient Egyptian surgeons had reached a high level of surgical skills and had developed procedures for hernia management ^[2]. An evidence of non-invasive management of inguinal hernia is depicted on Phoenician Statue (900 B.C.) where tightly fitting bandages were being applied in an attempt to reduce inguinal hernia. Egyptian pharaohs had well trained physicians and their duty was to preserve the health of the ruler ^[1]. The mummy of pharaoh Meneptah (1215 B.C.) shows a complete absence of the scrotum but not the penis. It is surmised that the surgeon attempted surgery for hernia ^[4, 5].

Greek Medicine

When Greek medicine (Now it is recognized as Unani Medicine) was at its peak, it was defined as a bulge, offshoot or

budding, by Hippocrates (460-377 B.C.). The Hippocratic School had differentiated hernia and hydrocele, the former was reducible and the latter trans-illuminable^[1].

Hippocrates was the first to completely describe the disease and correlated it with occupations^[4,6]. He suggested enema therapy for the cure of hernia. He says in *De Morbis* and *De Affectionibus*, "if a patient is holding enema, defecation will be there and so the healing"^[6].

Praxagorus of Cos (4th Century B.C.), evolved from the Hippocratic school, performed operations at that time^[7]. He was the first to give a method called TAXIS, to reduce an incarcerated hernia, the only method to save the patient's life^[8]. Taxis, in Greek, means arrangement as it is the procedure to reduce a hernia by holding the fundus in one hand while guiding the contents of it back into the abdominal cavity with the other hand. In other words, it is a method of re-arranging the incarcerated hernia back into the abdomen^[9]. Praxagorus was a great physician and anatomist. He taught in the Hippocratic School of Medicine in the island of Kos. He then moved to Alexandria, Egypt, as a young man and lived there for the rest of his life.

Herophilus, one of the great students of Praxagorus, born in the Greek town of Chalcedon, performed a number of human cadaveric dissections and explained most of the human anatomy. As Hippocrates is called the father of medicine, Herophilus is called the father of anatomy^[10].

This was the period when Greek (Unani) culture was at its dominance. Ptolemy I, the bodyguard of Alexander the Great (Sikandar-e-A'zam), founded a medical school in the city of Alexandria in Egypt, the then part of the former Alexander's empire^[11,12]. Herophilus then founded a section of anatomy in the same medical school in Alexandria in Egypt. He started to give anatomical lessons to his pupils. Erasistratus (310-250 B.C.), a disciple of Herophilus, made further contributions to the teaching and training of human anatomy^[13].

Most essential knowledge about hernia in late antiquity is derived from Galen^[3]. Galen was born in Pergamun, Asia Minor (present-day Turkey) in 129 A.D. to a wealthy architect. Pergamun at that time was the site of the magnificent shrine of the healing god Asclepius where distinguished figures of the Roman Empire visited for a cure. He received his primary education in Pergamun at Smyrna (Modern day Izmir, Turkey) and later moved to Alexandria medical school in Egypt for further medical education^[14]. Galen performed most dissections on living animals, mostly primates, because Roman Empire had prohibited human cadaveric dissection at approximately 1050 B.C. This forced Galen to perform animal living dissection rather than human cadaveric dissection^[15]. Galen advocated groin hernia surgery. He used to give incisions at the scrotum and dissected all layers to reach the testis. When the testis was free from all its coverings, an attempt was made to push the hernial sac back into its canal. Then he closed the external opening of the canal and removed the testis^[16].

Islamic Golden Age

During Umayyad (661-750 A.D.) and Abbasid Caliphate (750-1517 A.D.), Greek texts especially medical texts, were heavily translated into Arabic. And now the centre of knowledge and culture had shifted to Baghdad^[12]. Al-Mamun, the Abbasid Caliph, took a keen interest in exploring Greek science, philosophy, and medicine, and a

centre of learning and education Bayt-al Hikmah (house of wisdom) was established. He appointed Hunayn Ibn Ishaq the in charge of this house. Greek texts were translated into Arabic and made available for academics^[12,17]. Most of Galen's medical texts were translated into Arabic by Hunayn Ibn Ishaq^[11]. Later, Arab physicians played an important role in the advancement, exploration, propagation, and research of medicine. Zakaria Razi (Rhazes) in the book "Al Hawi" and Ibn Sina (Avicenna) in the book "The Canon of Medicine" described hernia and its treatment methods. Ibn Sina (Avicenna) advocated hernia reduction and avoided surgery. He said, "The patient should lie supine and an attempt is made to reduce hernia using warm towels, water, and softer medicines"^[18].

The excellent treatment methods for this disease can be found in the writings of Al-Zahrawi^[18], born in 936 A.D. in Al-Zahra, six miles northeast of Cordoba, the capital of Muslim Spain (Al-Andalus). He served as court physician to Caliph Al-Hakkam-II, during the period when medical science, philosophy, and mathematics reached their peak in Andalusia (Spain)^[19]. Around the year 1000 A.D., he wrote a book 'Al-Tasreef Liman Ajaz Aan Al-Taleef' (the clearance of medical science for those who cannot compile it). It was a summation of about fifty years of medical education, training, practice, and experience^[19,20]. Its 30th volume in three chapters is dedicated to surgery and its tools^[18,20]. He states in the book that surgical treatment of hernia needs a combination of anatomical knowledge and surgical skills. He has advocated two methods for hernia treatment; cauterization and operative procedure.

For cauterization, the patient should not eat for one day and use a laxative to clean his intestines. He lies on his back with legs flexed at the knees and extended at hips in such a way that both feet are under the buttocks. Both legs should be far from each other. An assistant holds the patient's legs and another assistant sits over his head and ensures that the patient's hands are in the same position as of legs. The patient is asked to hold his breath so that the intestine and peritoneum come to the scrotum. Now surgeon brings the contents back to the abdomen and one assistant places his hand on the anus (end of the intestinal tract). A semi-circular sign with two ends of it pointing toward the top of the body is drawn on the hernia (cicatrization). A hot cauterizer, of the same shape and size as cicatrized, is placed right on the marked sign. The surgeon now pushes the cauterizer upwards so that it reaches up to the pubic bone. After this treatment, the patient should lie on his back for 40 days in order to get the burn wound healed. For another 40 days, a bandage is firmly tied over the abdomen. During this period, the patient should use a soft diet. Zahrawi warns against the side effects of this treatment like severe burns and intestinal injury leading to a patient's death^[18].

For surgical treatment, Zahrawi returned the contents of the hernia back into the abdomen manually. The patient was laid supine with both legs bent. He then made the scrotum and scrotal raphe parallel so that tunica vaginalis can be reached easily. He separated the testis from surrounding structures and completely removed the intestines from the inguinal canal by his finger, stitched and closed the end of the canal in the form of a cross. He closed it in two layers and thus spermatic cord was also closed. He then removed the testis with the remainder of the cord. To control bleeding, he used cauterization^[18].

Andalusia (Modern day Spain) was the torch bearer of knowledge, wisdom, and civilization when the rest of what is known today as Europe lived in the darkness of the medieval era. It is narrated that the family of Albucasis (Al Zahrawi) descended from Al-Ansar (The supporter of Prophet Muhammad, Peace be upon him) of Al-Madina al-Monawwara in Saudi Arabia who settled earlier in Spain. Apart from his published work, few details of his life remained after the destruction of Al-Zahra during the later Spanish-Moorish conflicts ^[20].

Abd Al-Rahman, the predecessor of Al-Hakam-II had started construction of schools and hospitals in Spain ^[21]. Cordova University was established with the full facility of medical education by Abd al Rahman-II (822-852 A.D.). Later, further developments in the university were carried out by Al-Hakam-II ^[22]. Abul-Qasim Al-Zahrawi attended Cordova University ^[20].

Gerard of Cremona, (Born in 1114 A.D, Italy) was an alumnus of Cordova University and had translated the works of many major Greek and Arabic writers into Latin ^[22, 23]. In 1150 A.D., Gerard of Cremona had completed the translation of Al-Tasreef into Latin and thus contributed to its spread all over Europe. Al-Tasreef quickly became the standard reference book of medical science in Europe and was translated into Latin five times ^[20].

The development of efficient hospitals was an outstanding contribution of the Caliph of Cordoba to humanity. Only qualified and licensed physicians were allowed by law to practice medicine. For this, licensing and governing boards were set up under a government official called "Muhtasib" ^[20]. Later, other universities like the University of Toledo, Seville, Granada, and Valencia were established by the caliph of Cordoba, Abd-al Rahman-III and Al-Hakam-II. A heavy translation was done of Arabic medical texts into Latin at the University of Toledo. Various European alumni trained and educated from the above universities in Cordoba spread to different parts of Europe and helped establish their own educational institutions there ^[22]. For example, physicians trained and educated from the above medical universities in Andalusia (Muslim Spain) helped establish a medical school in Montpellier, France ^[24].

Medieval Europe

In this way, medical education had started at the University of Montpellier and good physicians and surgeons were produced. One of the greatest alumni from the University of Montpellier was Guy de Chauliac (1300-1368 A.D.) who became a famous surgeon of Europe in the middle ages ^[25]. In 1363 A.D., he wrote a book "Chirurgia Magna" on surgery and quoted Abul-Qasim Al Zahrawi (Albucasis) about 200 times ^[20], Ibn Sina 661, Zakaria Razi 161, Ibn Abbas 149 Hippocrates 120, and Galen (Jalinos) 890 times ^[26].

The book is divided into seven treatises such as anatomy, apothema (swellings), wounds, ulcers, fractures, special diseases, and an antidotary. Each of the first six treatises is divided into two doctrines. The first doctrine explains a generic approach to the subject and the second doctrine is divided into chapters based on specific regions of the body ^[26]. Hernia description and its treatment are written in Apothemes, Treatise II, Doctrine II, and Chapter 7 of Chirurgia Magna. According to Walsh, hernia treatment may have been the specialty of Guy de Chauliac. He

recommended conservative and surgical treatment for this disease. Many a time he used a truss for a groin hernia ^[26]. For non-surgical management, he writes the following. The physician should prescribe laxatives and bloodletting to aid intestinal motility. The patient should not eat beans, fresh fruits, brown bread, port wine, fish, cheese, or radishes. New wine and pure water are allowed, while intensive body exercises (coitus included) are forbidden. The gut must be kept cleansed by enemas, laxatives, and suppositories. Food must be seasoned with sage and each meal should include a pill of coriander and nasturtium covered with sugar. Moreover, the physician should try to push back the hernia by hand and keep the patient hung up by the legs. Now a special poultice must be applied to the hernial orifice. The patient should stay in bed for 50 days, and the poultice should be changed every nine days ^[27].

He may have tried to obliterate the hernial orifice responsible by excision of the testicle and then using cautery, arsenic, or the insertion of gold thread or wire around the orifice. All of these treatments had the aim of strengthening the weakened tissue at the deep inguinal ring through which the intestines prolapsed ^[26].

Conclusions

The earliest procedure of hernia repair included the reduction of its contents and closure of the external opening at the canal and so removal of the testicle. Perhaps it was so, that surgeons of that time had not distinguished all the layers of the anterior abdominal wall and the detailed anatomy of the inguinal canal were unclear. They attempted hernia surgery and closed the external opening in an attempt to obstruct the hernial protrusion. But after a detailed study of the inguinal canal has been carried out in the early 19th century, repair of the inguinal hernia became more advanced, although the principle remained the same, reduction of the hernia sac and obstructing the passage by strengthening the posterior wall of the canal.

References

1. Kingsnorth AN. General Introduction and History of Hernia Surgery. Management of Abdominal Hernias. Springer, London, 2013. Doi: https://doi.org/10.1007/978-1-84882-877-3_1
2. Leblanc KA. Laparoscopic Hernia Surgery: An Operative Guide. Taylor & Francis. United Kingdom, 2003.
3. Legutko J, Pach R, Solecki R, Matyja A, Kulig J. Rys historyczny leczenia chirurgicznego przepuklin [The history of treatment of groin hernia]. Folia Med Cracov. 2008; 49(1-2):57-74. Polish. PMID: 19140492
4. Hernia History | Atlanta Hernia Surgeon Lee Skandalakis MD FACS (herniaspecialists.com). Accessed 25.05.2023
5. Felix Edward, Rouse Tyler. The history of inguinal hernia surgery, opinion article, August, 2021.
6. Francesco Basile, Antonio Biondi, Marcello Donati. Surgical approach to abdominal wall defects: History and new trends. International Journal of Surgery. 2013; 11(1):20-23.
7. Tsoucalas G, Laios K, Zografos G, Androustos G, Karamanou M. Praxagoras of Cos (4th Century BC) and His Innovative Method of a Diverting Enterocutaneous Fistula to Relieve Small Bowel

- Obstruction. *Surg Innov.* 2019; 26(4):505-510. Doi: 10.1177/1553350619834836. PMID: 30915895.
8. Garg Gaurav, Jenaw Ratnesh, Chaudhary Sidharth, Garg KM. How safe is Taxis in hernia? Reduction of Gangrenous omentum-an uncommon occurrence. *IOSR Journal of dental and medical science.* 2014; 13(11):52-53.
 9. Pawlak M, East B, de Beaux AC. Algorithm for management of an incarcerated inguinal hernia in the emergency settings with manual reduction. Taxis, the technique and its safety. *Hernia.* 2021; 25(5):1253-1258. Doi: 10.1007/s10029-021-02429-1. PMID: 34036484; PMCID: PMC8147903.
 10. Herophilus Wiltse LL, Pait TG. Herophilus of Alexandria (325-255 B.C.). The father of anatomy. *Spine (Phila Pa 1976).* Sept. 1998; 23(17):1904-14. Doi: 10.1097/00007632-199809010-00022. PMID: 9762750.
 11. Holbl Gunther. A history of Ptolemaic Empire. Routledge, 2013, p21.
 12. Qadeer HA. *Tareekh-e-tibb Wa Akhlaqiyat.* 3rd ed. Delhi: Rabbani Printer, 2005.
 13. Reverón RR. Herophilus and Erasistratus, Pioneers of human anatomical dissection. *Vesalius.* 2014; 20(1):55-8. PMID: 25181783.
 14. Vivian Nutton. Galen Greek physician. The editor of encyclopedia Britannica, Apr 2023. [Http://britannica.com/biography/Galen](http://britannica.com/biography/Galen). Accessed-21.05.2023
 15. Stathopoulos P. Galen's Contribution to head and neck surgery. *J Oral Maxillofac Surg.* 2017, 1-2.
 16. Galen. Galen on anatomical procedures. (English translation by Wynfrid Lawrence Henry Duckworth). Cambridge university press. United Kingdom, 2010.
 17. [http://en.wikipedia.org/Hunayn Ibn Ishaq](http://en.wikipedia.org/Hunayn_Ibn_Ishaq). Accessed: 25.05.23
 18. Akerdi AT, Kazerooni MHB, Rouhezamin MR, Fazlzadeh A, Paydar S. Hernia repair in Golden Islamic Era; Review of Albucasis (Al-Zahrawi) Methods in Hernia Repair. *Res Hist Med* 2019; 8(2):123-128.
 19. Samir SA, Abdelghani T. Abu Al Qasim Al Zahrawi (Albucasis) Pioneer of Modern Surgery. *Ann Saudi Med.* 2007; 27(3):20-221.
 20. Elgohary MA. Al Zahrawi: The father of modern surgery. *Annals of pediatric surgery.* 2006; 2 (2):82-87.
 21. Britannica. the editors of encyclopaedia. "Al-Andalus". Encyclopedia britannica, feb 3, 2023, <https://www.britannica.com/place/al-andalus>. Accessed: May 30, 2023.
 22. Daud AM. The contributions of Islamic university Andalusia to revival western world. *Global journal of human social science* 2014; 14(5):5-24.
 23. Britannica. The Editors of Encyclopaedia. Gerard of Cremona. Encyclopedia Britannica, Jan 1, 2023, <https://www.britannica.com/biography/Gerard-of-Cremona>. Accessed on May 31, 2023.
 24. University of Montpellier - Wikipedia, Accessed-31.05.2023
 25. Britannica. The Editors of Encyclopaedia. Guy de Chauliac. Encyclopedia Britannica, Jul 21, 2022, <https://www.britannica.com/biography/Guy-de-Chauliac>. Accessed on May 31, 2023.
 26. David Watters AK. Guy De Chauliac: Pre eminent surgeon of the middle ages. *ANZ J Surg.* 2013; 83:730-734.
 27. Terranova, O, De Santis, L, Ciardo, L. The Bassini Operation. *Abdominal Wall Hernias.* Springer, New York, NY, 2001, p354. Doi: https://doi.org/10.1007/978-1-4419-8574-3_50