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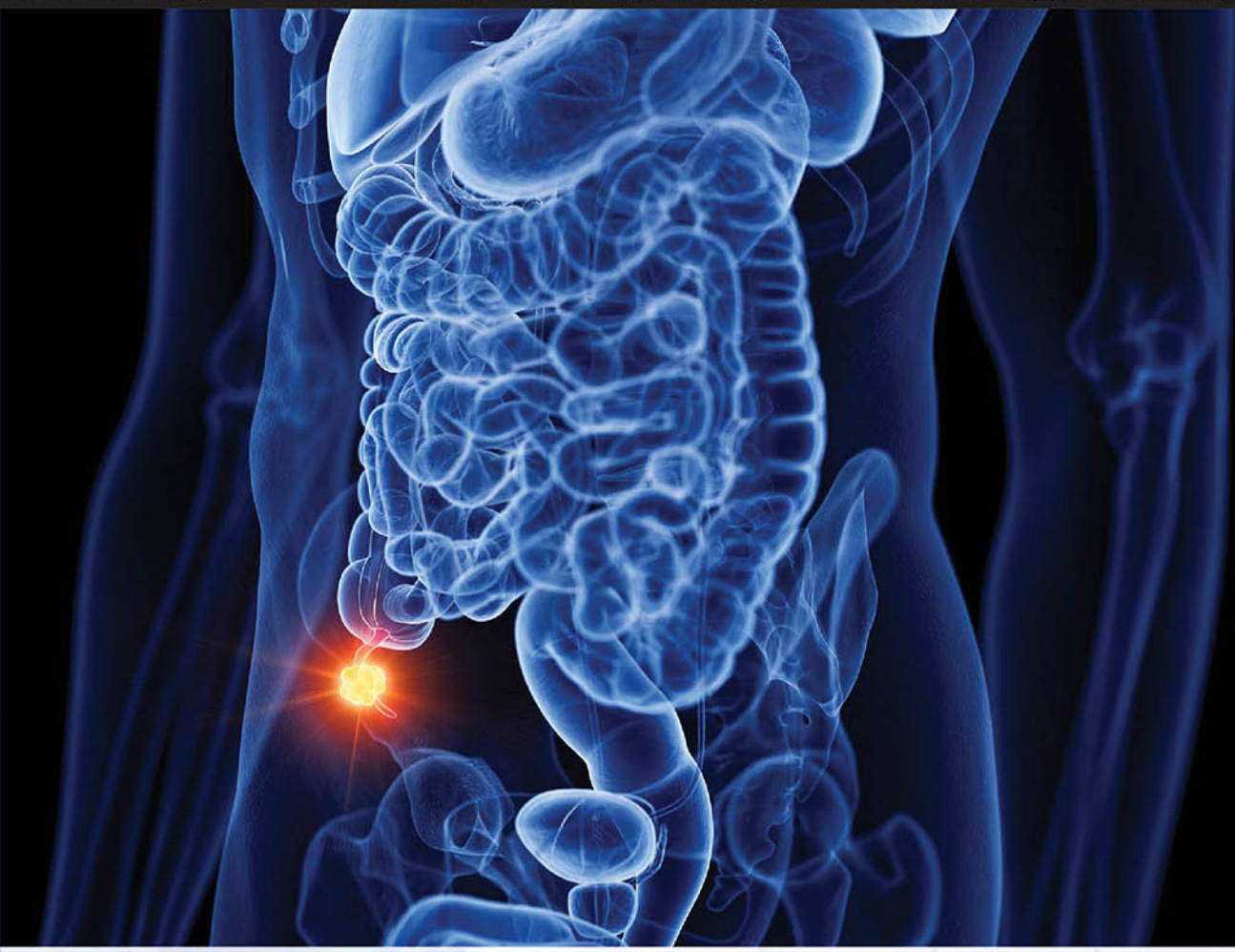

A HANDBOOK OF APPENDIX

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Foreword
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JAYPEE

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CHAPTER

2

Historical Background—Milestones

'Those who cannot remember the past are condemned to repeat it.'

—George Santayana

Important Milestones

- In 1736 Claudius Amyand did first appendicectomy.
- In 1880 Lawson Tait did first appendicectomy but reported in 1890.
- In 1886 Reginald Heber Fitz, coined the term 'Appendicitis'.
- In 1886 Kronlein reported first appendicectomy.
- In 1889 McBurney described McBurney's point.
- In 1889 McBurney also described Gridiron incision.
- In 1902 Ochsner–Sherren Regimen was given by Ochsner and Sherren.
- In 1982 Kurt Semm performed first laparoscopic appendicectomy.
- In 2009: First transvaginal removal of the appendix by Santiago Horgan and Mark A. Talamini—a procedure called Natural Orifice Transluminal Endoscopic Surgery (NOTES).

INTRODUCTION

Vermiform appendix and appendicitis remained a mystery for centuries. Donald C Collins, The Mayo Foundation mentioned in his research paper, 'Historic Phases of Appendicitis' in 1931 that, "It seemed reasonable to believe that the presence of appendix was well known when the pyramids were built, because all the visera were removed from the body during the process of mummification and placed in four separate coptic jars. In fact, certain coptic jars in which the intestines were placed contained inscriptions on the exterior referring to the 'worm' of the bowel..... In 1543, The Fleming, Andreas Vesalius, Professor of Anatomy at Padua, accurately described and illustrated the normal appendix, with its relationship to other organs, in the magnificent, 'De fabrica humani corporis.' "

- Appendix was found preserved in the mummy of a young princess of Egypt as described by Arthur Morgan Spencer, Powick Hospital, England.[1]
- 2000 years back appendix was shown in some Greek drawings of human body. It was shown as a small tail-like structure attached to the intestine which indicates that this is wrongly called vestigial organ.

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- In 1492 appendix was found sketched by Leonardo da Vinci in his notebook of anatomy.[2-5] It was called an ear (Orecchio).[6]
- In 1736 first appendicectomy was performed by Claudius Amyand,[7,8] (1685–1740) **(Fig. 1)**, who was a French born surgeon at St. George's Hospital London, England, who was Surgeon to King George-1st and 2nd and also was sergeant surgeon to Queen Ann. He was first principal surgeon to Westminster Hospital, and founder and first principal surgeon to St. George's Hospital.[8] This patient was an 11-year-old boy named Hanvil Anderson with right inguinal hernia. He developed a fecal fistula after a pin-prick of hernia leading to perforation of gut. The appendix was lying inside the hernial sac and the pin had perforated the appendix causing fecal fistula. The appendix and the culprit pin were removed during operation.[9] The patient improved and survived. He also repaired the hernia after removing the appendix.[10] The operation was performed without anesthesia. When the appendix is included in the hernia sac, it is known as Amyand's hernia. Amyand's hernia is very uncommon and characterized by the presence of the appendix in the hernia sac and it is 0.4–1% of all inguinal hernia cases, literature review also showed that incidence of Amyand's hernia is very rare, whereas only 0.1% of cases complicate into acute appendicitis due to late presentation and missed diagnosis **(Fig. 2)**.[11]
- In 1755 Lorenz Heister **(Fig. 3)**, German anatomist, surgeon, and botanist, reported the inflammation of appendix at an autopsy. Usually acute appendicitis was wrongly called as typhlitis or perityphlitis.[12]

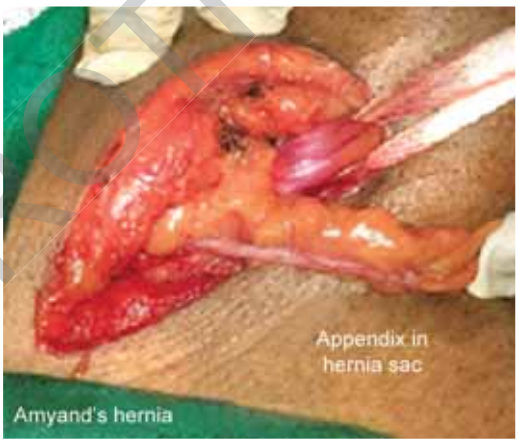

FIG. 2: Amyand's hernia—appendix present in a hernial sac.



FIG. 1: Claudius Amyand.



FIG. 3: Lorenz Heister.

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- In 1824 Louyer–Villermay a French Surgeon reported two cases of appendicitis in two autopsies. In 1827 François Milior, a French physician, reported six autopsy cases of appendicitis and he was the first who suggested the recognition of appendicitis. In 1839 Bright and Addison described symptoms of appendicitis and identified it as the primary cause of inflammatory process of right lower quadrant in their book 'Elements of practical medicine'. [13,14]
- In 18th century right lower quadrant (RLQ) pain was called perityphlitis and paratyphlitis. In 1827 Milior described several autopsy cases of appendicitis and declared that appendix was the likely cause.
- Thomas Hodgkin (1798–1866), a British physician, considered one of the most prominent pathologists of his time and a pioneer in preventive medicine. He is best known for the first account of Hodgkin's disease, a form of lymphoma and blood disease. In 1836 opined that partial inflammation of the peritoneum in the right iliac fossa is sometimes set up by disease in the appendix caeci.
- In 1848 Henry Hancock **(Fig. 4)**, Surgeon, Chairing Cross Hospital London, operated first reported case of appendicular abscess without removing the appendix. In those days the standard treatment was to drain RLQ after perforation of appendix.
- In 1880 Matterstock of Germany published papers writing that appendix was the cause of right iliac fossa inflammation.
- Reginald Heber Fitz (1843–1913) **(Fig. 5)**, Professor of Pathology, Anatomy and Medicine at Harvard University, coined the term 'Appendicitis' in 1886. He published this study of 257 cases. For the first time, he described the clinical features, pathological changes in appendicitis and classified the pathology in appendicitis in 1886. He published 'Perforating Inflammation of the Vermiform Appendix: With Special Reference to its Early Diagnosis and Treatment'. He distinguished it from 'typhlitis.'[15] He advocated early appendicectomy but as he was not a surgeon so his advice was not taken seriously **(Fig. 6)**.
- Rudolf Ulrich Kronlein **(Fig. 7)**, a Swiss Surgeon, is the man in reality who reported first detail account of appendicectomy in 1886. He performed the first appendicectomy in 1884. The patient died on 3rd postoperative day. He was a 17-year-old boy with acute appendicitis. Kronlein operated another patient on the same day and this patient had

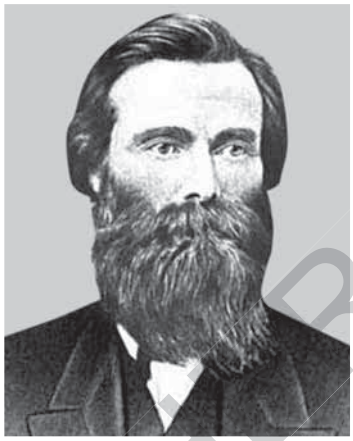

FIG. 4: Henry Hancock.

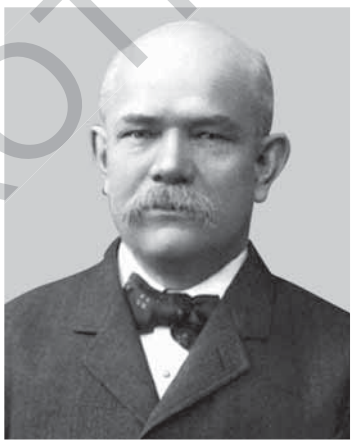

FIG. 5: Reginald Heber Fitz.

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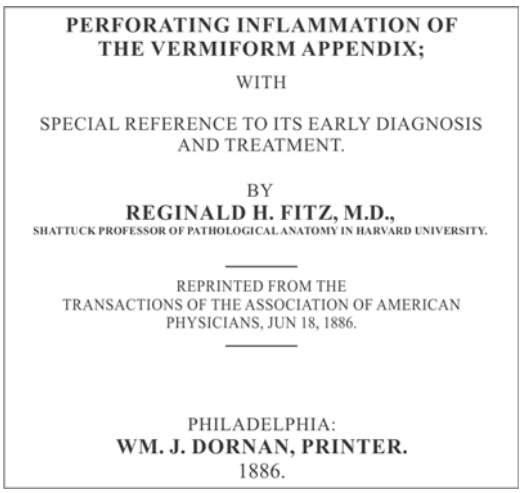
PERFORATING INFLAMMATION OF
THE VERMIFORM APPENDIX;
WITH
SPECIAL REFERENCE TO ITS EARLY DIAGNOSIS
AND TREATMENT.
BY
REGINALD H. FITZ, M.D.,
SHATTUCK PROFESSOR OF PATHOLOGICAL ANATOMY IN HARVARD UNIVERSITY.
REPRINTED FROM THE
TRANSACTIONS OF THE ASSOCIATION OF AMERICAN
PHYSICIANS, JUN 18, 1886.
PHILADELPHIA:
WM. J. DORNAN, PRINTER.
1886.

FIG. 6: Book on appendix by Reginald H Fitz.



FIG. 7: Rudolf Ulrich Kronlein.

developed acute peritonitis probably due to perforation of appendix. He did not remove the appendix but only cleansed and lavaged the peritoneal cavity. This patient recovered and survived. He was a reputable Professor of Surgery at Zurich University and was nominated for Nobel Prize in 1902.[16]

- Lawson Tait **(Fig. 8)**, Surgeon, Hospital for Diseases of Women, Birmingham, England[17] did first appendectomy in 1880 but he published his account after



FIG. 8: Lawson Tait.

10 years in 1890 so Kronlein was credited with first appendicectomy.

- In 1887, Thomas Morton, Philadelphia, USA, diagnosed correctly a case of appendicitis and operated successfully a perforated appendix and saved the patient.
- In 1889 Charles McBurney, Professor of Surgery **(Fig. 9)**, Columbia, College of Physician and Surgeons, New York, USA, described 'McBurney's Point'. He became Surgeon-in-Chief of the Roosevelt Hospital in 1888. Here he did his most famous work on appendicitis, presenting his report on operative management to the New York Surgical Society in 1889. He published his famous landmark paper in New York Medical Journal.
- McBurney's Point is the point of maximum tenderness in acute appendicitis. It is the meeting pint of lateral 1/3rd and medial 2/3rd of a line drawn from umbilicus to right anterior superior iliac spine. In his own words 'Very exactly between an inch and a half and two inches from the anterior superior process of ileum on a straight line drawn from that process to the umbilicus'.[18]
- McBurney incorrectly stated that this was an almost constant finding in patients with appendicitis. McBurney used to keep

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FIG. 9: Charles Mc Burney.

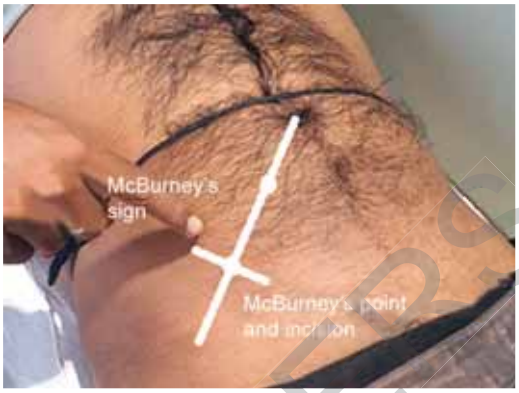

FIG. 10: McBurney's point of maximum tenderness and McBurney's incision.

his patients for at least 4 weeks on bed rest after surgery.[19]

- McBurney's incision, a muscle splitting incision for appendectomies, also called gridiron incision. In 1894, McBurney described 'Gridiron incision or McBurney's incision' **(Fig. 10)**.[20]
- McBurney's operation, operation for inguinal hernia.
- McBurney's sign, tenderness at McBurney's point in acute appendicitis.
- Albert John Ochsner, Professor of Clinical Surgery, University of Illinois, Chicago, and James Sherren, Surgeon. The London Hospital, London, advised a conservative management for late presentation of appendicitis with a lump. It is called 'Ochsner–Sherren Regimen'.
- In 1920, Sir Fredrick Treves **(Fig. 11)**, Surgeon, London Hospital, London, England[21] drained the appendicular abscess and removed the appendix of King Edward VII two days before his intended coronation. He performed the first appendicectomy in England, on 29 June 1888. King Edward was diagnosed with appendicitis. The King had opposed surgery because of upcoming coronation and Treves insisted, stating that if he was not permitted to operate, there would instead be a funeral.[22] The next day, Edward was sitting up in bed, smoking a cigar. He was applauded and earned a big name and fame as the man who saved the king. This incidence increased the confidence of public in surgery. By 1901, Treves had removed a thousand appendices.[23]
- In 1905 John Benjamin Murphy **(Fig. 12)**, Professor of Surgery, Northwestern University, Chicago, USA described sequence of symptoms of pain followed by nausea and vomiting with fever and tenderness in the position occupied by appendix[24] Murphy described this syndrome in 1903. In 1896, he was the first person to successfully suture a severed femoral artery; in 1898, he was

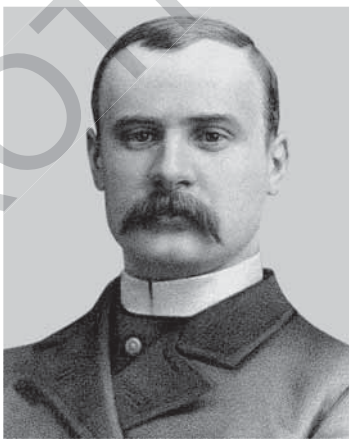

FIG. 11: Sir Fredrick Treves.

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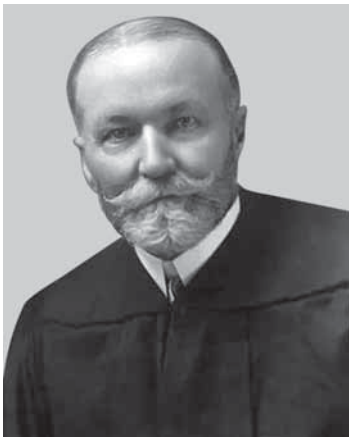

FIG. 12: John Benjamin Murphy.



FIG. 13: Kurt Semm.

the first person to do the thoracoplasty for pulmonary tuberculosis and pioneered bone grafting technique. William Mayo said of him 'The surgical genius of our generation'.[25]

- The mortality by appendicitis decreased to 20% by 1945 with availability of penicillin. The current rate of mortality is 0.25%.[26,27]
- In 1982 Kurt Semm **(Fig. 13)** performed successfully the first laparoscopic appendicectomy much before the first laparoscopic cholecystectomy[28]as a prophylactic measure during an ancillary procedure to a gynecologic operation.[29-33]
- The first reported case of appendicitis appeared in 1554, when Jean Fernel noted at autopsy the luminal obstruction, necrosis, and perforation of the appendix and cecum.[34-36]

It was not properly documented but some writings indicate that Indian ancestors of today's physicians and surgeons probably knew about appendix and appendicitis. As per Ayurveda Unduka is derived from Shonitakittabhaga.[37] Therefore Undukapuccha is also derived from it because Unduka is a terminology used both for Unduka and Undukapuccha (i.e., cecum and appendix).[37]

Key Point

Charles Darwin's Theory of Appendix, a vestigial organ is proved wrong.

REFERENCES

1. Mann CV, Russell RCG, Williams NS. Bailey and Love's Short Practice of Surgery, 22nd edition. Chapman and Hall; 1995. p. 829.
2. Gough DB, Donohue JH, Schutt AJ, Gonchoroff N, Goellner JR, Wilson TO, et al. Pseudomyxoma peritonei. Long-term patient survival with an aggressive regional approach. Ann Surg. 1994;219(2):112-9.
3. Finaly DJ, Doherty GM. Acute Abdominal pain and appendicitis, The Washington Manual of Surgery. Lippincott Williams and Wilkins; 2002. p. 258.
4. Doherty GM, Lewis FR Jr. Appendicitis: continuing diagnostic challenge. Emerg Med Clin North Am. 1989;7:537.
5. Finaly DJ, Doherty GM. Suit Abdominal Pain and appendicitis, The Washington Manual of Surgery, Lippincott Williams and Wilkins; 2002. p. 26.
6. Soybel DI. Appendix. In: Norton JA, Bollinger RR, Chang AE, Lowry SF, Mulvihill SJ, Pass HI (Eds). Surgery: Basic Science and Clinical Evidence. Springer, Berlin, Heidelberg; 2001.

JAYPEE BROTHERS

7. Chumber S. Appendix. In: Essentials of Surgery. New Delhi: Jaypee Brothers Pvt. Ltd. 2005. p. 833.
8. Mohamed AAR. Amyand: A Forgotten Surgeon and Hernia Case presentation and Literature Review. J Urol. 2009;7(1).
9. Amyand C. of an inguinal rupture, with a pin in the appendix Caeci, incrusted with stone; and some observations on wounds in the gut. Philos. Trans R Soc Lond B Biol Sci. 1735;39:329-36.
10. Ellis H. Appendix. In: Schwartz SI (Ed). Maingot's Abdominal Operations. 8th edition. Volume 2. Norwalk: Appleton-Century-Crofts; 1985. p 1255.
11. Khalid H, Khan NA, Aziz MA. Amyand's Hernia a case report. Int J Surg Case Rep. 2021;86:106332.
12. The Royal Society. Fellows. [online] Available from https://royalsociety.org/fellows/ [Last accessed December, 2023].
13. Lewis F. Appendix. In: Davis JH (Ed). Clinical Surgery. 1st edition. Volume 1. St. Louis: Mosby; 1987. p. 1581.
14. Addison T. An Essay on the Operation of Poisonous Agents upon the Living Body. Leopold Classic Library; 2015.
15. Fitz RH. Perforating inflammation of the vermiform appendix: with special reference to its early diagnosis and treatment. Trans Assoc Am Physicians. 1886;1:107.
16. Laios K. Rudolf Ulrich Kronlein (1847-1910): An Innovative General, Thoracic, Neuro, and Ocular Surgeon. Surg Innov. 2017;24(6):627-9.
17. Meade RH. An Introduction to the History of General Surgery. Philadelphia PA: Saunders; 1968.
18. McBurney C. Experience with early operative interference in cases of disease of the vermiform appendix. NY State Med J. 1889;50:676.
19. Lally KP, Cox CS, Androssy RJ. Appendix. In: Townsend CM, Beauchamp RD, Evers BM, Mattex KL (Eds). Sabiston Textbook of Surgery. 17th ed. Philadelphia: Elsevier Saunders; 2004. p. 1382.
20. McBurney C. The incision made in the abdominal wall in cases of appendicitis. Ann Surg. 1994;20:38.
21. Richardson RG. The Surgeon's Tale. New York, NY: Scribner's; 1958.
22. Treves SF. An account of the illness of King Edward VII in June 1902. Royal Archive Victoria. p. 9.
23. Ramchandran M, Aronson JK. Frederick Treves first surgical operation for appendicitis. JR Soc Med. 2011;104(5):191-7.
24. Murphy JB. Appendicitis with original report histories and analysis of one hundred and forty one laparotomies for that disease under personal observation. JAMA. 1984;22:302-4.
25. Williams SN, Bulstrode CJK, O'Connell PR. The Vermiform Appendix, Bailey and Love's, Short Practice of Surgery. 26th edition; 2013. p. 1203.
26. Blomqvist PG, Andersson RE, Granath F, Lambe MP, Ekbom AR. Mortality after appendectomy in Sweden, 1987-1996. Ann Surg. 2001;233(4):455-60.
27. Hale DA, Molloy M, Pearl RH, Schutt DC, Jaques DP. Appendectomy: a contemporary appraisal. Ann Surg. 1997;225(3):252-61.
28. Semm K. Endoscopic appendectomy. Endoscopy. 1983;15:59-64.
29. Cameron JL. Current Surgical Therapy. St Louis: Mosby; 1995. pp. 1025-8.
30. Gotz F, Pier A, Bacher C. Modified laparoscopic appendectomy in surgery: a report on 388 operations. Surg Endosc. 1990;4:6-9.
31. Valla JS, Limonne B, Valla V, Montupet P, Daoud N, Grinda A, et al. Laparoscopic appendectomy in children: report of 465 cases. Surg Laparosc Endosc. 1990;1:166-172.
32. Pier A, Cotz F, Bacher: Laparscopic appendectomy in 625 cases: from innovation to routine. Surg Laparosc Endosc. 1991;1(3):8-13.
33. Neugebauer E, Troidl H, Kum CK, Eypasch E, Miserez M, Paul A. The EAES consensus development on laparoscopic cholecystectomy. Appendectomy, and hernia repair. Surg Endosc. 1995;9(5):550-63.
34. Fernel J. Universa medicina. In: Major RH. Classic Description of Disease. 3rd edition. Springfield, IL: CC Thomas; 1945. pp, 646-8.
35. Graffeo CS, Counselman FL. Appendicitis. Emerg Med Clin North Am. 1996;14:653-71.
36. Gallos G, Cosgrove JM. Laparoscopic Appendicectomy. In; Brooks DC. Current View of Minimally Invasive Surgery, Springer; 1998. p. 53.
37. Reshma M, Shubha Devi V, Thyagarju K, Azaruddin MD. Morphological features and morphometric parameters of human fetal vermiform appendix at different gesetatoinal ages. J Anat. 2013;2:18-25.

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A HANDBOOK OF APPENDIX

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- Appendicitis is one of the most important and common surgical problems in the field of surgery. The book is primarily written for UG/PG students, surgeons, and surgical trainees.
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