Evolution of Different Surgeries of Cholecystectomy: A Historical Review

Abstract: First cholecystectomy was performed by Carl Langenbuch in June 1882. Langenbuch’s open cholecystectomy remained the gold standard for symptomatic cholelithiasis for over a century and even still being performed in many areas. In view of the emerging trend towards minimal invasive surgery, the evolution of laparoscopic surgery started in 1982 and the first laparoscopic surgery was appendectomy in 1982. As a bridge between traditional laparoscopic surgery and natural orifice transluminal endoscopic surgery, the recent focus has been on the development of single incision laparoscopic surgery (SILS) to further minimize the invasiveness of laparoscopic surgery by reducing the number of incisions.

Keywords: Gall stone disease, Demographic shift, Cholecystectomy

INTRODUCTION

The earliest reported gallstones date back to 21st Egyptian dynasty (1085-945 B.C.) having been discovered in the gallbladder of the mummy of a priestess of Amen. According to Gordon-Taylor, the first clinical description of gall stone disease was recorded in 4th century BC.1

In 1341, Gentile da Aligno demonstrated human gall stones as one of the findings at autopsy during the public dissection.2,3 In 1442, Florentine pathologist, Antonio Benevieini demonstrated gall stone in a woman who died with abdominal pain.4 Paracelsus, in 1500, commented on the theory that “chemical disturbances in the body initiated the precipitation of impurities in the biliary ducts”. In 1546, Vesalius demonstrated eighteen calculi in the gall bladder of famous advocate who died after brief illness.5,6 Jean Louis Petit, the founder of gall bladder surgery in 1773, suggested removal of gall stones and drainage of the gall bladder, thus creating fistula in patients with empyema which he successfully performed in 1743.7 This gall bladder surgery continued till 1859 when J.L.W. Thudichum proposed a two stage elective cholecystectomy.8 In the first stage, the inflamed gall bladder was sewed to the anterior abdominal wall through a small incision, which served as a route for the removal of gall stones at a later date.

First cholecystectomy was performed by Carl Langenbuch in June 1882 on a 43 year old male patient.9 The patient had biliary colic for 16 years. In USA, first cholecystectomy was done by Justus Ohage in 1886. Langenbuch’s open cholecystectomy remained the gold standard for symptomatic cholelithiasis for over a century and even still being performed in many areas.

In view of the emerging trend towards minimal invasive surgery, the evolution of laparoscopic surgery started in 1982 and the first laparoscopic surgery was appendectomy in 1982. On September 12, 1982 Erich Muhe, in Boblingen, Germany, performed a laparoscopic cholecystectomy by looking through the scope (without video optics).10 A piece of bicycle tubing was used as a large cannula through which gall bladder was removed. There was a lot of criticism regarding this method and his license was revoked thereafter.11 In 1987 Mouret from France performed the laparoscopic cholecystectomy after completing a gynaecological laparoscopy on a woman also suffering from symptomatic gallstone. When he shifted his laparoscope to the sub-hepatic area and upon finding a comparatively free and supple gall bladder he decided to remove it laparoscopically instead of opening up. He performed the procedure successfully and the patient recovered without complications.12 Finally in September 1992, a NIH consensus conference held in Bethesda concluded that laparoscopic cholecystectomy was the treatment of choice for gall bladder stones.13 Now the laparoscopic cholecystectomy is the gold standard procedure for cholelithiasis.

Since the introduction of laparoscopic cholecystectomy as the gold standard procedure to remove the gallbladder, many surgeons have attempted to reduce the number and size of ports in laparoscopic cholecystectomy to further decrease parietal trauma and improve cosmetic results. These efforts are some of the fundamentals of the natural orifice
transluminal endoscopic surgery (NOTES) approach, which removes transabdominal incisions completely, but natural orifice transluminal endoscopic surgery is technically challenging and current instruments need to be further improved.\textsuperscript{xi,xiii}

The development of natural orifice transluminal endoscopic surgery (NOTES) has opened the field of incisionless surgery. The idea of accessing internal organs through the wall of the vagina, colon, stomach, bladder and so forth, with the use of rigid or flexible instruments is an attractive one. However, the challenge of obtaining a clean access site thereby preventing intra-abdominal spillage or infection from the incision has not been able to be fully avoided.\textsuperscript{xii} Additionally the concern over closure of the luminal incision and the lack of a single effective operative closure technique for stomach, esophagus, or colon, so far limits the application of this technique. Moreover, the possibility of generating bowel overdistention due to the pneumoperitoneum, required for adequate visualization of intra-abdominal structures is still a concern.\textsuperscript{xiii} With current ongoing research on the efficacy and safety of natural orifice transluminal endoscopic surgery, it is still premature to advocate it as an alternative to laparoscopic surgery of the biliary tract. Closure technique for stomach, esophagus or colon, so far limits the application of this technique.

As a bridge between traditional laparoscopic surgery and natural orifice transluminal endoscopic surgery, the recent focus has been on the development of single incision laparoscopic surgery (SILS) to further minimize the invasiveness of laparoscopic surgery by reducing the number of incisions.

Single incision laparoscopic surgery or SILS refers to the operative technique in which a surgical procedure is carried out through one incision, alternatively, it is also known as laparoendoscopic single site (LESS) surgery. Single incision laparoscopic surgery was described as early as 1992 by Pelosi et al\textsuperscript{xiv} who performed a single puncture laparoscopic appendectomy, and in 1997, by Navarra et al\textsuperscript{xv} who performed a laparoscopic cholecystectomy via two trans-umbilical trocars and three transabdominal gallbladder stay sutures. SILS can be performed using refinements of existing technology and surgeons can perform SILS without any new instruments, specific competence or training. Single incision laparoscopic surgery may offer the advantages of reducing postoperative pain and virtually scarless surgery.

Single incision laparoscopic cholecystectomy has emerged as an alternative technique to improve cosmesis and minimize complications associated with multiple incisions. The goals of single incision laparoscopic cholecystectomy are similar to the goals behind the development of natural orifice transluminal endoscopic surgery like decreased pain, decreased length of hospital stay, better aesthetic results and increased patient satisfaction.\textsuperscript{xvi,xvii} Multiple articles regarding the use of SILC/LESS cholecystectomy have been published since the initial two studies were published by Bresadola et al\textsuperscript{xviii} and Piskun and Rajpal,\textsuperscript{xix} leading to a wealth of information regarding the possible adoption of the SILC/LESS cholecystectomy by surgeons worldwide, including a 2010 consensus statement by the Laparoendoscopic Single-Site Surgery Consortium for Assessment and Research (LESSCAR).

The use of a single umbilical incision to remove the gall bladder was an interesting innovation and, since Navarra’s initial description, the single incision laparoscopic cholecystectomy (SILC) procedure has gained momentum.

\textbf{CONCLUSION}

Langenbuch’s open cholecystectomy remained the gold standard for symptomatic cholelithiasis for over a century and even still being performed in many areas. In view of the emerging trend towards minimal invasive surgery, the evolution of laparoscopic surgery started in 1982 and the first laparoscopic surgery was appendectomy in 1982. As a bridge between traditional laparoscopic surgery and natural orifice transluminal endoscopic surgery, the recent focus has been on the development of single incision laparoscopic surgery (SILS) to further minimize the invasiveness of laparoscopic surgery by reducing the number of incisions.

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