Editorial

The Evolution of Minimal Access Surgery and the Laparoscopic Cholecystectomy

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Surgery is the first and the highest division of the healing art, pure in itself and perpetual in its applicability (1). In its history, large incisions were an absolute necessity to a successful procedure. Exposure was the key to a safe and successful operation. Surgeons have traditionally attempted to find new methods to treat their patients' afflictions while reducing the injury caused by the treatment hence the evolution of minimally invasive techniques. Access to body cavities in order to undertake surgical procedures by other means than making a large cut has been a technique waiting for its time(2). Though exposure is still essential for a safe and successful operation, it is now possible to access body cavities to perform surgical operations by making smaller incisions; the fundamental concept of minimal access surgery. Minimally invasive surgery may be as old as humanity itself. The holy bible mentions the ‘operation’ of Eve’s creation and the possibly the first ‘endoscopy’ where “The King of Babylon stood at the parting of the ways, to use divination, he made his arrows bright, he consulted with images, he looked in the liver” (3, 4).

The actual practice of minimal access surgery (MAS) can be traced to the early 18th century. In 1795, Bozzini developed the Lichtleiter, a crude endoscope, which used a candle for illumination (5). In 1868, Kussmaul performed esophagogastroscopy on a willing sword-swallower using a tube illuminated by the reflected light of gasoline lamp (6).

In 1901, Kelling performed the first examination of the abdomen using a cystoscope in a dog (7). Jacobeus performed the first human celioscopy in Sweden in 1910, advocating the technique for the evaluation of patients with ascites (8). In 1923, Kelling reported his 22 years of experience with laparoscopy to the German Surgical Society and became one of the earliest advocates of MAS so as to reduce the prolonged and costly stay of a laparatomy (7, 8).

The light sources used in the early laparoscopes were primitive and surgeons always had to contend with the risk of thermal burns to intraabdominal contents. In 1938, Veress developed a needle with a spring-loaded obturator that allowed safe insertion and insufflation of the peritoneal cavity (8). In 1966, Kurt Semm introduced an automatic insufflation device capable of monitoring intraabdominal pressures paving the way for safer laparoscopy and fewer complications. The development of thermal coagulation, irrigation systems and different knot tying techniques by Semm elevated laparoscopy to a safe procedure which could be utilized in common clinical settings. Semm was also instrumental in popularizing laparoscopy in gynecologic and general surgery despite skepticism from many surgeons (8, 9).

In 1882, Carl Langebuch (1846-1901) of Germany had performed the first cholecystectomy. One hundred years later on September 12, 1985, Prof Dr Erich Mühe performed the first laparoscopic cholecystectomy(LC) (10) . In 1986, Mühe presented his findings on laparoscopic cholecystectomy before a skeptical German Surgical Society Congress. In the next two years reports were received from France of similar procedures being carried out (10, 11). In 1985 Erich Muhe was ostracized for laparoscopic cholecystectomy, untill his recognition by SAGES in 1999 after a 14 year professional exile(12). McKernam and Saye performed the first laparoscopic cholecystectomy in the United States in June 1988, but the technique was refined and popularized by Reddick and Olsen who made a presentation at the American College of Surgeons meeting in the fall of 1989. Their presentation that included video demonstrations thrust the procedure to the global limelight and soon evolved into the standard for management of calculus cholecystitis. The revolutionary nature of this procedure has been unprecedented in surgical history, and it's true significance has been concluded to be the cultural change it engendered in the field of general surgery, rather than the operation it replaced (13,14).

No other operation has so profoundly affected the ushering in of the MAS era than LC. The initial driving force behind the rapid development of LC was patient demand. Prospective randomized trials were late and largely irrelevant because advantages were clear. Hence, LC was introduced and gained acceptance not through organized and carefully conceived clinical trials but by acclamation and opened the door for the expanded application of MAS to other abdominal and thoracic cavities as well as potential anatomical spaces like the neck and the axilla.

The popularity of these minimal access techniques led to a new domain in surgical training, with a move away from the apprenticeship model, toward structured programs of teaching new skills outside the operating room. Acquisition and mastery of basic laparoscopic skills must precede the performance of advanced laparoscopic operations (15,16). There is a core group of fundamental skills common to all advanced laparoscopic operations. Such skills are best acquired in skills laboratories using surgical trainers, animal models, virtual reality trainers, or other simulated operating conditions before the trainee performs these procedures in the operating room on patients. Examples of such skills include two-handed instrument manipulation, dissection, intracorporeal suturing, and intra- and extracorporeal knot tying. Prior open experience with a specific operation via celiotomy will also promote mastery of the equivalent laparoscopic procedure. It is estimated that between 1990 and 1992, approximately15,000 general surgeons in the US were trained in LC . Most of the training was accomplished without any form of recognized oversight or accreditation by means of "short courses" involving animal labs. Predictably, there followed a spike of surgical misadventures and an increased rate of common bile duct injury. It was soon apparent that the "weekend" or short course without ongoing proctoring was not the optimal training format for the adoption of these new techniques (17).

The evolutionary development of LC and MAS in the third world, and at the Kenyatta National Hospital in particular , which Prof Jani and Gill(18) has correctly termed as a "transition" in this issue of the journal, parallels what happened nearly three decades ago in the west. They have correctly attributed to the slow pace of acceptance of LC at 67% in twenty years compared to the 90% elsewhere to the limited number of trained surgeons, training facilities and equipments. However, the pace at which the “trasition” took place in some other parts of the world with almost the same environment partially mitigates against the non-human factors as the only culprit (19, 20). An analysis of the sceptical nature of the adherents of open surgery, and the uncertainity of their ability in the new technique coupled with the deliberate slowness or misinterpretation of information to the recipient; the patient, may go a long way in deciphering this unique phenomena.

It is interesting to note that in those two decades of minimal access surgery at the Kenyatta National Hospital, advanced laparoscopic procedures such as herniorrhaphies, thoracoscpies,colectomies, urological, endocrine, billiopancreatic and bariatric surgeries are not routinely performed. This is a true reflection of the level of training of the attending preceptors and proctors in our tertiary institutions. It is worrying that neither are basic laparoscopic skills mastered nor are advance techniques introduced to trainees. The integration of advanced laparoscopic surgical skills into surgical residency and the safe incorporation and performance of advanced laparoscopic operations into surgical practice should be facilitated (20, 21). Training both residents and faculty is essential in order to facilitate resident education in minimally invasive surgery in the future. As practice patterns evolve, and the frequency of laparoscopic operations increases.

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