Invited editorial

Minimal access maximal success; A myth or a reality

A B S T R A C T

Minimal invasive surgery is one of the most challenging advances in the craft of surgery in last 2 decades. In our country the advanced craft has been in practice for more than one and a half decade and some of our committed surgeons have mastered this craft and made an impact not only on national level but also on international level. Many times we may get impressed by watching the masters in the craft but forgetting the efforts the master has put in to reach the zenith and in a bid to imitate the master we may ignore the awaiting disaster. In this article I will be discussing the overall impact of this surgical craft globally and its various evidence based pros and cons with a particular reference to colorectal surgery to ascertain whether the craft of minimal access with maximal success is a myth or a reality.

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The standard practice has been evolving to become less invasive. Laparotomy the usual gold standard upto the 1990s; was gradually replaced by Laparoscopy in 1990s and today it is SILS and Robotics. The boom of technology has over a period of years influenced all our spheres of patient management and in case we say no to technology then we will be lagging behind but the important caution for all the experienced and budding surgeons is that we should be guiding the technology rather than being guided by the technology. In this regard I am presenting an evidence based overall review of the minimal access surgery being practiced worldwide with a special reference to colorectal surgery and testifying whether minimal access with maximal success is a myth or a reality.

Laparoscopy in colorectal cancer

Laparoscopic colonic resection still has an acceptance rate of less than 10% when compared to laparoscopic cholecystectomy where the acceptance rate has gone beyond 90%. Since, colon and rectal cancer constitute biologically two different entities so it would be worthwhile to discuss them separately.

1. Laparoscopy for colonic cancer

Moises Jacob' is credited with first laparoscopic colectomy. This Craft took time to pick up because of long learning curve, doubtful oncological safety in the initial years and the main concern was port site metastasis.2 But with the passing time more and more evidence about the safety of this laparoscopic procedure saw the light of the day which in turn increased the acceptability for the procedure.

Evidence came from multiple randomized controlled trials (RCTS) all over the globe like: Barcelona trial

It was the first trial in early 90s conducted with a purpose to ascertain the overall safety of laparoscopic colonic surgery in colon cancer. This trial was conducted on 219 patients; and the conversion rate was 11%. The main drawbacks were: learning curve, lack of structured training, developing technology, less number of patients, and less acceptance by surgeons and patients. Cancer-free survival remained same in laparoscopic and open group. Confidence interval (CI) ranged between –3.2 and +7.2% which in other words means that in a worst case scenario 3-year survival after lap is 7.2% less than open group. This is the only randomized control trial that showed oncologic benefits after laparoscopy. Lacy et al.3 reported longer cancer-related survival and less tumor recurrences after laparoscopy in patients with stage III disease. All of the other large prospective multicenter trials did not demonstrate long-term oncologic outcomes in favor of laparoscopy.4-6

The COLOR (Colon cancer Laparoscopic or Open Resection) Trial is a multicentre study that included 1248 patients with colon cancer randomized into two groups – laparoscopic resection (n = 627) and open resection (n = 621). Conversion rate was 17%. The laparoscopic group had longer operating times but less blood loss, earlier recovery of bowel function, fewer analgesic requirements and shorter hospital stay. There was no difference in radical resection margin or 28-day morbidity and mortality. The authors concluded: ‘laparoscopic surgery can be used for safe and radical resection of cancer in the right, left, and sigmoid colon’.7 In COLOR trial – no difference was found in the total cost to the society incurred by lap or open surgery within 12 weeks of surgery. However, lap surgery was more costly for the Health care system. Also there was no difference in disease-free survival.8

COST (Clinical Outcomes of Surgical Therapy) Study Group studied colon cancer randomized into two groups (laparoscopic...
resection [n = 435] and open resection [n = 437]) from 48 institutions between 1994 and 2001. Only surgeons who had done ≥20 resections participated in the study. Conversion rate was 21%. The laparoscopic resection group had longer operating times but quicker recovery, shorter hospital stay and more intra-operative complications (not statistically significant). There was no significant difference in morbidity and mortality, tumor recurrence or overall survival. The trial favored that laparoscopic colorectal resection can be carried on safely.5

The MRC CLASICC (Conventional vs. Laparoscopic-Assisted Surgery in Colorectal Cancer) Trial was done between 1996 and 2002 in 27 UK centers. It randomized 794 patients with colon and rectal cancer into laparoscopic resection (n = 526) open resection (n = 268) with a ratio of 2:1. The CLASICC trial was the first RCT to include patients with rectal cancer. The study reported a 25% conversion rate for colon cancer and 32% for rectal cancer. Patients who had conversion ended up with increased complication rates. Also, there was higher incidence of positive circumferential resection margin after laparoscopic anterior resection but this did not reach statistical significance. There was no difference in hospital mortality or quality of life at 2 weeks and 3 months postoperatively. The authors concluded: ‘laparoscopic resection for colon cancer is an effective alternative to open surgery’. However, impaired short-term outcomes after laparoscopic resection for rectal cancer do not yet justify its routine use.4,6

Meta analysis from Barcelona, COST, CLASICC and COLOR trial conducted on 1765 patients reported a confidence interval (CI) = −5% to +4%, which is taken as a clinically acceptable difference.10 The conclusion was that laparoscopic colorectal surgery is oncologically safe.

2. Laparoscopy in rectal cancer

Czerny is credited with abdominopерineal excision for rectal carcinoma in 1884. Krate gave the concept of trans-sacral approach for rectal resection in 1885. Sir Ernest Miles the British surgeon in 1908 improved on the concept of abdominopерineal excision (APER) for rectal carcinoma on basis of “Anatomic rectal carcinoma” studies and introduced the concept of “Zone Of Upward Spread” and stressed on Wide Perineal Excision.11,12

Dixon (Mayo Clinic, 1930) devised low anterior resection (LAR) for treatment of favorable tumors of mid-rectum and it became the procedure of choice and after comparison of results viz-a-viz morbidity, mortality or local recurrence no difference was found by several studies.12–15

Until 1970s most thought that 5 cm distal margin from the tumor is a must for achieving distal tumor-free margin but Williams et al. (1983) described that distal spread of tumor > 2 cm in less than 2.5% of excised tumors after extensive pathological clinical studies of sphincter saving procedures and concluded that a distal margin of 2 cm is safe.12,16

Morino reports a conversion rate of 18% while as Poulin reports 27% for AR, 3% for APR. CLASSIC Trial reports a conversion rate of 32% for rectal cancers. The short-term outcome with regards to Stomal function, Bowel movement and Length of stay was better in laparoscopic than open.17 Bladder dysfunction remained same while as there was a marked difference in sexual dysfunction (lap 47%; open 5%).18 However, CLASSIC trial reports bladder and sexual dysfunction same in both. Circumferential resection margin (CRM) positivity: in Anterior resection (AR), CRM positivity in lap vs. open was 12% and 6% (p-value 0.19) while as for abdominoperalineal resection (APR), it was 20% vs. 26% (p-value 1.00).19 For AR Lap vs. open 3-year local recurrence was 7.8% vs. 7% (p-value 0.70) and for APR it was 21% and 15% (p-value 0.47%). For AR Lap vs. open 3-year disease-free survival is almost same and statistically nothing significant has been reported.20

Short-term outcome for laparoscopic rectal resection is better but needs more trials. Long-term results of these studies are awaited. However, the main difficulty to adapt to this craft continues to be a steep learning curve for laparoscopic colorectal resection but some believe that learning curve is an arbitrary definition and may vary amongst the surgeons. But studies have proven beyond doubt that the complication rates for a new laparoscopic craft keep on declining as soon as the learning curve gets negotiated. A marked decrease in complication rate at Cleveland Clinic is reported from 29% to 11% and 7% in 1991, 1993 & 1995 in laparoscopic colorectal surgery.21 Also the conversion rate decreases as the learning curve is negotiated.22 Port Site Recurrence: No clear data exists. Multi-center RCT on comparison in two groups report <1% recurrence (p = 0.50).23

Randomized trial of laparoscopic-assisted resection of colorectal carcinoma: 3-year results of the UK MRC CLASICC trial group

Successful laparoscopic-assisted surgery for colon cancer is as effective as open surgery in terms of oncological outcomes and preservation of QOL. Long-term outcomes for patients with rectal cancer were similar in those undergoing APR and AR, and support the continued use of laparoscopic surgery in these patients.20

3. Cochrane systemic review of RCT24

- Laparoscopic resection of ca colon is associated with long-term outcome that is similar to open colectomy.
- Laparoscopic surgery for ca upper rectum is feasible but more RCTs need to be conducted to assess long-term outcome.

Recent studies have also reported that there was clinically no relevant difference in postoperative QOL between 2 groups.25 But still some latest references report that laparoscopic colorectal resection is associated with a significantly higher intra-operative complication rate than equivalent open surgery.26

Compulsions to increased MAS adoption

Why we need so many randomized trials and meta-analysis for comparison; cant we carry out with same old time tested methods of open surgery. I believe with so much of developing technology we also do get influenced to take up the craft because of the following reasons:

- Human nature
- Enthusiasm
- Evidence
- Impact factor
- Patient demand
- Survival factor in corporate health sector

Minimal access maximal success; a myth or a reality?

With so much of evidence available with us, I believe it was a myth but now is becoming a virtual reality. Why virtual? Because there are so many challenges to increased MAS adoption like:
• Lack of doctor awareness and referral patterns
• Complications
• Stress factor
• Cost factor
• Health Insurance sector which is still not fully evolved in third world
• Learning curve

Errors

• “To err is human”. The poet and essayist Alexander Pope said almost exactly three centuries ago.

But a Surgeon has to realize that MAS errors has maximal gravity and these errors can get accentuated because of:
• Selling Dreams: Deceptions by fraudulent advertisements by doctors
• Lack of competence about a particular craft
• Under-reporting of complications by the surgeons
• Safety factors which usually are compromised in third world in a primitive type private sector.
• Media and public pressure

One should remember that “Staggering” numbers of people are harmed and killed by medical errors, with an impact on one in ten patients. Patients are sometimes harmed no matter how dedicated and professional the staff (Dr Paul Shannon (WHO)).

We as responsible doctors have to realize that even with the best will in the world no doctor or nurse can know everything. We all have strong points and weak points in our knowledge and skills. We have good days and bad days, like the rest of people. In order to minimize our errors we need to:

• Improve decision making
• The necessary information about a patient is essential, Information at your fingertips, when you need it, and easily accessible. It helps avoid pitfalls and promotes bespoke decisions: forewarned is forearmed. The patient feels valued, listened to and at the center of your attention.
• The full recording of clinical observations facilitates reconciliation and enhances continuity of care.
• If the notes are consistent and trustworthy, then they will be trusted by the next clinician who treats the patient.
• Follow WHO Protocols.
• Electronic systems are terrific at discovering the source of problems because they allow data to be captured automatically.
• Making mistakes is human, but carrying on with them is Devilish (Seneca).

Laparoscopy in colorectal cancer surgery has a definite place. However, we now need to judiciously select candidates who would definitely benefit from laparoscopy surgery rather than repeatedly attempting to make laparoscopy a generalized clinical practice guideline via randomized trials.

It will halt the ever increasing confusion about the place of laparoscopy in complex gastro-intestinal surgery.27

Most of the time we as surgeons may be at fault rather than the technology we are adopting. The main fault with us even of today is not mastering the craft properly and adopting it prematurely forgetting that what we are putting at risk is not only the human life but at the same time the reputation of our skill as well as the gadgetry we are using. Probably, no monitoring authority in the world can really quantify our skills about a particular craft as our conscience. In order to improve our skills for adopting a difficult craft like laparoscopic colorectal surgery I believe that one should at least practice following things:

• Talking straight
• Honest reporting of our complications
• Self-auditing
• Auditing by an independent observer
• Acquiring proper training
• Morals above economy
• Involving insurance sector and NGO.

Then definitely I believe virtuality will be a reality one day.

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References


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