Laparoscopic colonic cancer surgery in New Zealand: where and when is it safe?

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More than 20 years have passed since laparoscopic colonic surgery was first reported in the literature.\(^1\) Due to greater technical difficulties with laparoscopic colorectal surgery, uptake was initially slow compared with other operations such as cholecystectomy. In more recent years laparoscopic colorectal resection has increased dramatically, with rates as high as 60% in some regions.\(^2\) Over this time, several multicentre randomised trials have demonstrated that laparoscopic colonic surgery has equivalent oncologic outcomes to open surgery\(^3\) and is associated with some short term benefits in patient recovery.\(^4\) While this is level I evidence, it arises from tertiary and academic units, so its applicability to regional New Zealand is questionable.

In this issue of the *NZMJ*, Turagava et al present a case series of laparoscopic colorectal resections from one of New Zealand’s larger secondary centres, Palmerston North Hospital (PNH).\(^5\) The authors attempt to address the question of the appropriateness of laparoscopic colorectal surgery in a regional setting. The paper reports the short term outcomes of 76 laparoscopic colonic resections for cancer, the majority of which were performed by one experienced laparoscopic surgeon, over a 10-year period.

The results presented are excellent, demonstrating morbidity and mortality rates of 27.5% and 1.3% respectively. Short-term patient and oncologic outcomes were also very satisfactory. The results were compared with the Australasian Laparoscopic Colon Cancer Surgical (ALCAaS) trial, the short-term results of which were reported in 2008.\(^6\) When compared with the ALCAaS data, there was no difference in mortality, morbidity or return of bowel function. In fact, several of the parameters from PNH compared very favourably; patients tolerated fluids a day earlier and the rate of intraoperative complications was statistically significantly lower in the PNH series.

Does this indicate laparoscopic colorectal surgery can be performed safely throughout regional New Zealand? Before drawing this conclusion, both the context of this study and some of the issues surrounding implementation, training and conducting randomised trials in laparoscopic colorectal surgery deserve further discussion.

Firstly, in considering Turagava et al’s study, it is necessary to acknowledge the significant limitations in the comparison of the two datasets from PNH and ALCAaS, which were obtained with very different methods. The collection of data in the setting of a prospective randomised trial has predefined outcomes and is far more rigorous than the case series presented here.

Nowhere is this difference more obvious than in the comparison of intraoperative complications. The ALCAaS trial reported a high rate of intraoperative complications in the laparoscopic arm. Closer inspection of these complications reveals the majority were minor bowel injuries or minor haemorrhage which appeared to be of little
clinical consequence. The fact they were registered at all reflects the RCT methodology where an independent observer was present in the theatre to record these events. Such events are more likely to be recognised and recorded by an independent observer with laparoscopic than open surgery.\(^7\)

Retrospective series such as that from PNH, will inevitably underestimate such minor events as many would not be recorded in standard operation notes. The corresponding author of the PNH study also recently published a meta-analysis confirming a higher rate of intraoperative complications in laparoscopic surgery across 10 trials, including the ALCAaS data.\(^8\) For the reasons already mentioned, and the fact the overall outcomes were not altered, the clinical significance of this finding remains debatable. However, it is a sobering reminder of the need to monitor and avoid the potential for harm to patients with the introduction of new techniques.

The learning curve for laparoscopic surgery (as for training surgeons in open surgery) also creates the potential for harm. Previous trials of laparoscopic surgery that did not employ strict pre-trial credentialing demonstrated a significant learning curve. The MRC CLASSICC trial conversion rate reduced from 45\% in the initial phase to 15\% in the final year of recruitment, obviously influencing the intention to treat analysis.\(^9\)

The data from PNH presented was predominantly from one very experienced laparoscopic surgeon with 8 years laparoscopic colorectal surgical experience prior to the study period. The key message here is that outcomes from laparoscopic colorectal surgery are highly operator dependent. Adequate training and experience are required, irrespective of the setting, in order to avoid the potential for harm to patients.

In addition to operator dependence, laparoscopic surgery is also heavily technology-dependent. Technology has progressed rapidly in recent years and for this reason the two different time periods compared in Turagava et al’s analysis also confound the results. Accounting for the rapid evolution of surgical technique and technology is not a problem unique to this study, but represents a significant issue in interpreting the results of surgical RCTs in the context of contemporary practice.

A long period is required for multicentre trials such as ALCAaS to firstly achieve sufficient recruitment for adequate statistical power and then to observe long term outcomes of interest (e.g. 5-year recurrence and survival). ALCAaS commenced with a pilot study in 1996 then, after 8 grants, took 14 years to complete.\(^10\) Over that time significant developments in monitors, energy devices, laparoscopic bowel graspers, wound protectors, and stapling devices occurred.

These developments, combined with technical refinements associated with increasing experience, all have the potential to produce incremental beneficial effects on the outcomes of the procedure. It is not necessarily reasonable to assume the laparoscopic procedures performed in 1998 at the commencement of recruitment had the same outcomes as those performed in 2012.

Despite these limitations, RCTs remain the most effective tool to assess new techniques against current gold standards and ensure their safety. The point at which surgeons adopt these new techniques will also vary and is influenced by many factors, including the duration of RCTs, the evolution of technology and the effect this has on the balance of equipoise over that period.
The rapid uptake of laparoscopic colorectal cancer surgery occurred during the period of ALCCAaS recruitment, despite guidelines recommending such surgery should only occur in the setting of a randomised trial. This was both driven by patients and surgeons and the difficulties are reflected in recruitment rates of patients to trials; many eligible patients were excluded based on their (or their surgeon’s) preference for one type of surgery over another.

The practicalities of RCTs mean that surgeons will adopt new techniques prior to full and final results of such trials being available. Once again, the importance of individual surgeon experience and training in this situation cannot be overestimated.

The series from PNH demonstrated what an experienced laparoscopic surgeon can achieve in a secondary setting. While trials, with their inherent limitations discussed, have shown safety and efficacy of laparoscopic surgery, any surgeon undertaking laparoscopic surgery in any setting, has a duty to ensure they and their team are adequately equipped to do so.

Current New Zealand guidelines state that “laparoscopic surgery for colon cancer has equivalent outcomes to conventional surgery” but also recommend that “elective surgery for colon cancer should be performed by a surgeon with specific training and experience in colorectal surgery and with sufficient caseload to maintain surgical skills.” These are very general statements. More specific guidelines from professional bodies that better define training pathways and objective minimum standards may help to ensure the appropriate use of laparoscopic colorectal surgery, thus minimising the effect of the learning curve and avoiding potential for harm to patients in adopting this technique.

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References: