Clinical research has demonstrated that laparoscopic liver resection for hepatocellular carcinoma (HCC) or secondary colorectal metastases (CRM) provides oncologically equivalent outcomes when compared to open liver resection, while also providing a statistically significant reduction in postoperative complications. Approximately 16% of all liver resections in Canada are performed laparoscopically with a compound annual growth rate of 16%. In the Canadian healthcare environment, hospitals face constrained budgets and it is critical to demonstrate the budget impact of laparoscopic liver resection to help increase procedure volumes. This study was conducted to determine the budget impact of increasing the proportion of laparoscopic vs. open liver resection in a Canadian hospital.

We examined the budget impact of increasing the percentage of laparoscopic liver cases from 16% to 40%, while decreasing the number of open cases proportionately in a hospital that performs 50 resections annually. The model assumes that 74% of cases have a diagnosis of CRM and 26% have a diagnosis of HCC in accordance with Ontario Case Costing Initiative (OCCI) data. The model considers the costs associated with surgery, length of stay (taking into account facility and staff costs) and post-operative complications for HCC and CRM separately. The cost data used in the model was obtained from peer reviewed literature, the OCCI and from costing data obtained from a large Canadian hospital. Data on patient outcomes was obtained from published meta-analyses. A multivariate sensitivity analysis using a Monte Carlo simulation was completed to ensure scientific rigour. The costs for recovery room, lab tests, pharmaceuticals, diagnostic imaging and physiotherapy are specific to either laparoscopic or open liver resection.

Laparoscopic liver resections are associated with higher device costs, but this is offset by a shorter length of stay of 3.2 days with a diagnosis of HCC and 2.3 days for a diagnosis of CRM. The inpatient cost for one laparoscopic liver resection with a diagnosis of CRM is $3,497 less than an open resection (see Table 1.0 for detailed cost breakdown). Similarly, the inpatient cost for one laparoscopic liver resection with a diagnosis of HCC is $4,616 less than for an open resection.

Additionally, a reduced incidence of surgical complications is associated with laparoscopic liver resection. For HCC a meta-analysis found a reduced incidence of blood transfusions (from 19.8% to 9.9%)

The model establishes that for a Canadian hospital performing 50 liver resections increasing the proportion of laparoscopic cases from 16% to 40% allows for a potential cost avoidance of CAD $50,730 annually.

The utilization of laparoscopic versus open liver resection for hepatocellular carcinoma or secondary colorectal metastases was compared to open resection.

In a Canadian hospital, laparoscopic liver resection provides cost avoidance for hepatocellular carcinoma or secondary colorectal metastases when compared to open resection.

REFERENCES

3. Canadian Institute for Health Information procedure data for laparoscopic vs. open liver resection from 2011-2014
4. Case-Costing Data from a Large Canadian Hospital Network found the hourly cost of the OR ($2,300/hour) and the daily cost of an inpatient stay ($1,145/day).
5. Ontario Case Costing Initiative (2011). The cost of recovery room, lab tests, pharmaceuticals, diagnostic imaging and physiotherapy was retrieved specific to either laparoscopic or open liver resection.