

Minimising the 'cost' of laparoscopic cholecystectomy



Laparoscopic cholecystectomy entered into the surgical treatment of gallbladder disease in 1985.^[1] This was at a time when innovation rather than evidence was the driving force for the operation. It became evident that the persistent Achilles heel of this operation was bile duct injury (BDI), the incidence of which has remained twice that of open cholecystectomy.

The report by Hofmeyr *et al.*^[2] on the rand cost of surgical repair of BDI for patients treated at the Digestive Diseases Centre at the University of Cape Town Private Academic Hospital is a prudent reminder of the devastating effects of these injuries. This series is the only one to have addressed any aspect of BDI in South Africa (SA), and specifically quantifies the financial cost, an aspect on which there is a paucity of international publications. This study, which analysed the financial implications of the repair of 44 major BDIs, shows that the (average) cost of ZAR220 000 is six times greater than the cost of an uncomplicated laparoscopic cholecystectomy. This does not take into consideration the cost of the initial operation or any radiological or operative interventions that may be required before the patient is transferred for management of the BDI. Inclusion of these costs would raise the amount to at least eight times that of an uncomplicated laparoscopic cholecystectomy.

Two international costing studies have addressed this issue. A 2011 US study reported on the cost of 108 BDIs over 18 years.^[3] The hospital costs for the 98 major injuries in this series yielded a cost per individual (converted to rands) of ZAR410 000. Twenty-eight patients required interventions before referral with BDI, but these prior costs, as in Hofmeyr *et al.*'s study, were not factored into the total cost calculation or used as a predictor of increased costs at the institution definitively repairing the injury.

A 2008 Swedish study analysed the cost in a much smaller group of 24 patients with 14 minor and only 10 major BDIs.^[4] They included in their costing model factors not addressed by the Cape Town group, namely those related to sick leave and loss of productive days. The cost per major injury was ZAR1 080 000. Good national data on the incidence of BDI allowed the Swedish group to calculate the cost per million of the population ... ZAR6 000 000.

Neither the US nor the Swedish study benchmarked the cost against laparoscopic cholecystectomy, which would have allowed some degree of comparison between studies. Some of the factors that affect the complexity and accuracy of costing models have been alluded to. One of the considerations in the SA context is whether such a detailed private hospital costing model can be applied to BDI repairs performed in state hospitals. The authors' impressions are that at least 50% of these injuries are managed in state facilities where intensive care and interventional radiology costs, which accounted for 38% of the total cost in Hofmeyr *et al.*'s^[2] study, are difficult to define accurately.

The costs of the BDI repair are not the only financial costs. Those arising from the medicolegal ramifications are considerable. In the USA, recently reported data on 248 cases of BDI calculated the average payouts to the plaintiffs who sought legal redress for their injury. The 70% of plaintiffs for whom the court judgment was in their favour received an average compensation of ZAR9 711 600; cases settled out of court received two-thirds of that amount.^[5] To these figures can be added the legal fees and the escalating costs of medical protection cover, which in this country have increased tenfold over the past 10 years.^[6]

The non-fiscal 'costs' are also highly significant for the patient, the 'injuring' surgeon and their families. Several studies have addressed the quality-of-life aspects of patients, both physical and psychological. The former are largely short lived. The latter have been shown in a recent meta-analysis to be remain significant even after long-term follow-up.^[7] This is particularly true if revisional bile duct surgery, hepatic resection or liver transplantation are required, all of which also contribute to the risk of death.

There is furthermore an adverse impact on the surgeon during the process of litigation, which includes significant stress, anxiety, and loss of productivity resulting from a loss of self-esteem during a legal process hinged on negligence. In SA a less adversarial resolution for both the patient and the surgeon would be in everyone's interest. Berney^[8] outlines the legal framework that would permit a more amicable resolution.

Given the grave consequences of a BDI as outlined, active steps need to be taken to reduce the incidence of this complication, and, if it does occur, to optimise management. A multifaceted approach is required. This begins with a registry of all BDIs in SA to quantify the true extent of the problem. As all injuries should be managed by specialist hepatopancreaticobiliary (HPB) surgeons, this should be logistically feasible. Primary prevention would entail a reduction in the number of unnecessary cholecystectomies. Laparoscopic cholecystectomy has doubled the number of cholecystectomies being performed in most countries where it is widely practised,^[9] yet the benign natural history of asymptomatic gallstones is unchanged.^[10] Secondary prevention would require ensuring that general surgeons are effectively trained in a standard safe method of performing the operation.^[11] This must emphasise recognition of the difficult gallbladder and that conversion to a less dangerous laparoscopic approach such as subtotal cholecystectomy or an open procedure is appropriate. There are efforts underway in SA to improve surgical mentorship and the environment to achieve this. Tertiary prevention is essential to help minimise the impact of these complications when they do occur. A BDI should be managed and repaired by an expert HPB team. Repair of a BDI by the injuring surgeon markedly jeopardises the chances of success, especially when delay causes sepsis.^[12] In the emergency situation, the priority is to manage systemic and local sepsis effectively and to transfer the BDI patient to a specialised centre as soon as possible.

Hofmeyr *et al.*^[2] are to be congratulated on their study aimed at raising awareness of the consequences of BDI. The 'costs' are enormous, and the surgical community needs to embrace a multifaceted approach aimed at reducing the impact of this devastating complication.

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1. Reynolds W, jr. The first laparoscopic cholecystectomy. *JLS* 2001;5(1):89-94.
2. Hofmeyr S, Krige JEJ, Bornman PC, Beningfield SJ. A cost analysis of operative repair of major laparoscopic bile duct injuries. *S Afr Med J* 2015;105(6):454-457. [<http://dx.doi.org/10.7196/SAMJ.9038>]
3. Cannon RM, Brock G, Buell JE. A novel classification system to address financial impact and referral decisions for bile duct injury in laparoscopic cholecystectomy. *HPB Surg* 2011;2011:371245. [<http://dx.doi.org/10.1155/2011/371245>]
4. Andersson R, Eriksson K, Blind PJ, Tingstedt B. Iatrogenic bile duct injury – a cost analysis. *HPB (Oxford)* 2008;10(6):416-419. [<http://dx.doi.org/10.1080/13651820802140745>]
5. Anandalwar SP, Choudhry A, Choudhry AJ, et al. Litigation in laparoscopic cholecystectomies. *Am Surg* 2014;80(6):E179-E181.
6. Bateman C. Medical negligence payouts soar by 132%. *S Afr Med J* 2011;101(4):216-218.
7. Landman MP, Feurer ID, Moore DE, Zaydfudim V, Pinson CW. The long-term effect of bile duct injuries on health-related quality of life: A meta-analysis. *HPB (Oxford)* 2013;15(4):252-259. [<http://dx.doi.org/10.1111/j.1477-2574.2012.00586.x>]
8. Berney CR. Major common bile duct injury and risk of litigation: A surgeon's perspective. *Am J Surg* 2012;204(5):800-802. [<http://dx.doi.org/10.1016/j.amjsurg.2011.06.009>]
9. Talseth A, Lydersen S, Skjedlestad F, Hveem K, Edna TH. Trends in cholecystectomy rates in a defined population during and after the period of transition from open to laparoscopic surgery. *Scand J Gastroenterol* 2014;49(1):92-98. [<http://dx.doi.org/10.3109/00365521.2013.853828>]
10. Sakorafas GH, Milingos D, Peros G. Asymptomatic cholelithiasis: Is cholecystectomy really needed? A critical reappraisal 15 years after the introduction of laparoscopic cholecystectomy. *Dig Dis Sci* 2007;52(5):1313-1325. [<http://dx.doi.org/10.1007/s10620-006-9107-3>]
11. Strasberg SM. A teaching program for the 'culture of safety in cholecystectomy' and avoidance of bile duct injury. *J Am Coll Surg* 2013;217(4):751. [<http://dx.doi.org/10.1016/j.jamcollsurg.2013.05.001>]
12. Flum DR, Cheadle A, Prela C, Dellinger EP, Chan L. Bile duct injury during cholecystectomy and survival in Medicare beneficiaries. *JAMA* 2003;290(16):2168-2173. [<http://dx.doi.org/10.1001/jama.290.16.2168>]

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