

# Laparoscopic Cholecystectomy: complications and experiences in Tonga.

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## Abstract

Laparoscopic Cholecystectomy is a safe option but expensive for Pacific countries. This paper reviewed the procedure and its complications and reflects on the experience of surgeons in Tonga. It concluded that this procedure is viable and desirable for patients in Tonga but suggests that the opportunity costs of the equipment should be considered in the light of many other competing health needs. (PHD 2006 Vol 13 No 2 Pages 107 - 110)

## Introduction

The first successful cases of laparoscopic Cholecystectomy were reported in 1989.<sup>1</sup> Since the early 1990s, it has largely replaced open Cholecystectomy as the preferred procedure for the removal of the gall bladder gallstone disease. The procedure has resulted in dramatic decreases in the amount of time required for postoperative hospital stay. In addition the patient is subjected to much less trauma intra-operatively and consequently to less pain postoperatively. Gone are the days of a ten day postoperative stay for a patient who has had an open Cholecystectomy as it is not uncommon for patients who have had a laparoscopic Cholecystectomy to be discharged the day after the operation or at most after two days in the hospital. Complications however still occur and the most common is a bile leak. The rate of reported injury during the operation varies from 0 to 1%.<sup>2-4</sup>

Despite the fact that laparoscopic Cholecystectomy under best circumstances is ideal for the patients, at times complications do occur and result in increases morbidity. This paper reviews the procedure, indications and contraindications and the complications related to it and assess its suitability for the Pacific setting.

## The Laparoscopic Cholecystectomy Procedure

The procedure begins after routine preparations with the open insertion of the Hassan cannula supra or subumbilically. Through this cannula the light source and camera is inserted. Two further 5 mm ports are placed under the right and left costal margin. Through these ports the operating instruments are inserted when

required. Gas is used to inflate the abdominal cavity to create a pneumoperitoneum to gain a better view.

The operation focuses on dissecting the gall bladder-cystic duct junction. The two structures that are identified are the cystic duct and cystic artery. These are then ligated and divided before the gall bladder is dissected out of the gall bladder bed and brought out through the periumbilical opening. The small incisions made are then closed after careful checks have been made to ensure there are no leaks.

## Indications and Contraindications

All patients with cholecystitis should be considered for laparoscopic cholecystectomy. It is deemed to be safe in about 90% of cases. Contraindications for any surgery are those patients who are unfit for general anesthesia or who have an untreatable bleeding tendency. The only absolute indication directly related to the gallstone disease is a stone impacted at the lower end of the common bile duct. Relative surgical contraindications include acute cholecystitis, usually those lasting more than 48 hours and previous history of upper abdomen surgery. If the cholecystitis has lasted more than 48 hours and especially if the patient has had previous episodes of cholecystitis or inflammation, dissection can be difficult.

Most of the patients who had a conversion from a laparoscopic cholecystectomy to an open cholecystectomy have been patients who have had previous episodes of inflammation making dissection rather difficult due to the resultant scarring and adhesions. Coagulation disorders, pregnancy and portal hypertension have been mentioned as relative medical contraindications.

For patients on Warfarin especially following valvular surgery, laparoscopic cholecystectomy is the preferred surgery for gall bladder disease as there is much less tissue damage and therefore less risk of bleeding

compared to an open Cholecystectomy. With pregnancy, provided there is no other contraindication, it is relatively safe in the second trimester and the only contraindication would be a technical one with the enlarging uterus. Obviously if the surgery can be deferred until after the pregnancy then this should be done as is the experience approach locally in Tonga.

### **The Tongan Experience with Laparoscopic Cholecystectomy**

Laparoscopic surgery for cholecystectomy has been available in Tonga since 2000. Over the last five years, surgeons in Tonga have been carrying out the procedure and during that period equipment failure has not been a reason for conversion or carrying out an open Cholecystectomy. This stresses the importance of caring for the equipment and good relationship and communication with the supplier of the equipment. Over the first eight months of 2005, 13 patients have had laparoscopic cholecystectomy and none have developed any complications. There has been only one case of open cholecystectomy and the decision to do this open was decided preoperatively.

The case of SF, a 40-50 year old, fat, female is here used as case in point. She has been troubled with gall bladder problems for a few years. She had been advised to have open Cholecystectomy a number of times but she decided against it after talking to a friend's friend who had had the operation. In particular she had been put off by the post operative recovery phase of pain, chest physiotherapy treatments, slow recovery and relatively long hospital stay. Upon the availability of laparoscopic Cholecystectomy, SF consented to have the surgery. She was admitted to the Surgical Ward on Tuesday morning, operated on in the afternoon and was discharged the following morning with no complications. This demonstrates the potential for this treatment.

Currently two surgeons are capable of carrying out the technique and the other surgeons are being trained. The surgeons carrying out the operation have learned the technique while overseas. It's essential that a surgeon carrying a laparoscopic cholecystectomy must know how to do an open cholecystectomy because of the need to be able to convert from a laparoscopic to open Cholecystectomy should the need arise.

At this point in time the only other countries in the Pacific known to offer laparoscopic cholecystectomy are Papua New Guinea and Fiji. Access to laparoscopic cholecystectomy in the Pacific is dependent on two major factors. The first of these is the availability of

trained staff. The equipment may be available, but trained personnel are not available locally. In such a situation the learning curve for the surgeon to do a laparoscopic Cholecystectomy will be a steep one as it was in Tonga. The other reason for unavailability of lap cholecystectomy is unavailability of equipment. A new set of lap cholecystectomy instruments would cost in excess of AUD\$ 50,000. Given the limited resources in most Pacific countries, this would be considered inappropriately exorbitant. If purchased and with trained personnel, the relative limitations to service access due to the geographical dispersion Pacific islands make it difficult for patients from the outlying islands to obtain the service from the main centre(s).

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### **Complications**

Most of the complications are directly related to biliary leakage. In addition, other possible complications included retained stone, intra-operative bleed, wound infection, wound haematoma, postoperative ileus and basal atelectasis.

The consequences of biliary leak can range from nothing to death. A majority of leaks will be asymptomatic. Bile

leakage usually results either from a major cystic duct injury, and unsecured cystic duct stump or leakage from the gall bladder bed. The basis for major duct injury is the misidentification of the biliary anatomy during dissection of the cystic duct and artery. Leakage from the gall bladder bed is caused by injury to the small duct that drains a portion of the liver directly to the gall bladder.

There had been discussions early on after the introduction of laparoscopic cholecystectomy as to whether different variations to the anatomy were a significant cause of biliary leak. It has been shown<sup>5, 12</sup> that the anatomy of the region of the gall bladder is relatively constant. In this series of 186 patients the anatomy was found to be normal in 88%. This implies that the cystic duct was anterior to the cystic artery. Anatomical variations were uncommon and anomalous ducts were not seen. The most common variation was vascular in nature in that the cystic artery was found to be anterior to the cystic duct in 9% of the patients. Biliary abnormalities were limited to abnormal gall bladder in situ in four cases and very short cystic ducts.

As for the recognition of complications, a review of duct injuries for patients in Victoria for the years 1997-1999 revealed some concerning results.<sup>6</sup> The two aspects of particular concern was the fact that a large proportion of the injuries (74%) were not recognized intraoperatively.

Because they were not recognized, it took a long time for them to be referred for about 12 days. An earlier report also found similar results.<sup>7</sup>

## Discussions

The emphasis for prevention of complications in laparoscopic cholecystectomy is based on careful choice of patients and preoperative screening, careful dissection to identify the biliary tree anatomy clearly and visualizing all that is done. To this end, a number of recommendations have been made of steps to follow to prevent injury during surgery.<sup>2,8-9</sup> The most widespread of these protocols is that put forward by Hunter.<sup>8</sup> He proposed the following technical steps:

1. Promoting liberal use of 30° angled laparoscope as it provides a more perpendicular view of the hilar structures.
2. Using firm cephalad retraction of the fundus of the gall bladder which expose the hilar structures.
3. Having the first assistant retract the infundibulum of the gall bladder laterally instead of parallel to the common duct to separate the cystic and the common ducts.
4. Dissecting the cystic duct circumferentially and continuously into the gall bladder.
5. Converting to an open cholecystectomy whenever bleeding becomes more than a minor problem.

The issue of using intra-operative cholangiography is a debatable issue with one school of thought advocating it use<sup>8,11</sup> and the other not.<sup>5,11</sup> Those that advocate its use point out that abnormal biliary anatomy when present is a challenge even for the experienced surgeon. Those that don't advocate it point to the fact that abnormal variation in anatomy is rare and even when present is usually not clinically relevant when a careful and accurate dissection is made.

Obviously making laparoscopic cholecystectomies safe would mean addressing the three major factors that can prevent complications. These can be conveniently divided into the surgeon, patient and equipment factors. The learning curve for carrying out the operation is steep and there is no doubt that the surgeon has to be on top of his or her game. Currently in the Pacific there is no formal courses available for teaching the procedure. In Australia and New Zealand though there are courses specifically designed for this purpose. This makes use of a wet lab with animal models for practice. Available in the Pacific is on the job training where laparoscopic

cholecystectomy is carried out. Improving the surgeon's performance is mostly up to the surgeon to keep upskilling and keeping his/her skills up to the required level. The importance of a careful and accurate dissection cannot be stressed enough. Post operative patient assessment cannot be overstated to screen for patients that may have factors that may make the surgery complicated or should signal a change of approach from a laparoscopic cholecystectomy to an open one. At times it may even signal the surgery should not be carried out at all.

Equipment factors are usually beyond the surgeons capabilities and this calls for the availability of skilled technicians to be able to address equipment failure. In the Pacific this would have to be perhaps the most limiting factor to carrying out procedures that rely on very technical equipment. This has been witnessed in the islands with other diagnostic as well as therapeutic equipment. The importance of good communication and rapport with the suppliers is crucial for the up keep and maintenance of the equipment. The Tongan experience has been

favorable over the past five years with the laparoscopic Cholecystectomy equipment with no equipment failure witnessed so far. Factors that have been in Tonga's favor have been that the equipment was bought new and good contact with the supplier maintained.

Assessing the above factors including the costs would enable Pacific islands to decide whether laparoscopic cholecystectomy would be the preferred option for them. The initial cost of obtaining the equipment may be prohibitive for some but the consumables are relatively minimal. The Tonga experience shows that in the Pacific this can be a workable option. However the opportunity cost of expensive acquisitions for rare diseases while there are other pressing competing health will needs to be carefully considered.

## Conclusion

This paper has examined laparoscopic Cholecystectomy procedure and the prevention of complications. There is no doubt that the key to prevention of complications is a careful and accurate dissection. The basic principles of surgery will go a long way into prevention the complications of laparoscopic Cholecystectomy. The Pacificans we can learn from others' experience and make judgments to minimize the complications we encounter and the opportunity cost of technology.

### **Obviously making laparoscopic cholecystectomies safe would mean addressing the three major factors that can prevent complications**

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*"Few things are impossible to diligence and skill.... Great works are performed not by strength, but perserverence."*

**(Samuel Johnson (1709 - 1784))**