

## THE SAFETY OF LAPAROSCOPIC CHOLECYSTECTOMY IN SICKLE CELL DISEASE: AN UPDATE

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As surgery in sickle cell patients is associated with high morbidity, this study aims to establish the safety of minimally invasive surgery in this high-risk group. Over a four-year period, 71 sickle cell patients underwent laparoscopic cholecystectomy (LC) for cholelithiasis. Five patients had asymptomatic gallstones. Preoperative gastroscopy and endoscopic retrograde cholangiography were performed in 7 and 14 patients, respectively. Forty-two patients were given simple blood transfusions, while 13 received partial exchange transfusions. The mean operative time was 80 minutes and the conversion rate was 5.6%. There were 10 (14%) postoperative complications, the majority of which were respiratory and wound-related. One patient (1.4%) died as a result of postoperative vaso-occlusive crisis. The median hospital stay was 2.5 days. We believe that laparoscopic cholecystectomy is safe in patients with sickle cell hemoglobinopathy who are particularly at risk of developing pigmented gallstones. Therefore, the use of minimally invasive surgery is encouraged in any sickle cell patient undergoing operative intervention. *Ann Saudi Med 1998;18(1):12-14.*

Sickle cell disease (SCD), prevalent in certain parts of the world, is the most common genetic disorder affecting man. It is believed that 1.7% of the population of the Eastern Province of Saudi Arabia is affected.<sup>1</sup> Affected individuals are at an increased risk of developing pigmented gallstones,<sup>2,3</sup> and this risk increases with age. Patients with symptomatic stones will certainly require surgery that may be associated with high morbidity and mortality as a result of perioperative and postoperative complications, mainly vaso-occlusive crises (VOC). The introduction of minimally invasive surgery is believed to be associated with minimal risks to the patients due to its numerous advantages over conventional methods. We have already reported elsewhere our initial experience with laparoscopic cholecystectomy (LC) in our sickle cell patients.<sup>4</sup> The purpose of this report is to update our experience and to establish beyond any doubt the safety of LC in sickle cell patients with gallstones.

### Patients and Methods

All SCD patients with gallstones who underwent LC between October 1992 and December 1996 were included

in the study. Preoperative hemoglobin electrophoresis (Helena Laboratories, USA) was performed on every patient. Patients were admitted three days before the planned operation and the decision for preoperative blood transfusion was made. Patients with hemoglobin of 10 g/dL or above were not transfused. If hemoglobin was lower than 10 g/dL, simple blood transfusion with packed red cells was given. Partial exchange transfusion was given to patients who were considered severely ill, based on a history of frequent hospital admissions with sickling crises and presence of sickle-related complications.

All patients were adequately hydrated the night before the operation by setting up an intravenous line. Subcutaneous heparin (5000 U) was given with premedication as deep vein thrombosis (DVT) prophylaxis. Prophylactic antibiotics (cefuroxime 1.5 g) were given intravenously with the induction of anesthesia. Surgery was conducted by an experienced laparoscopic surgeon, i.e., a surgeon with biliary experience and adequate laparoscopic knowledge who had attended a laparoscopic workshop with "hands-on experience," had already passed the learning curve, and had independently conducted more than 50 LCs in non-sicklers. The operative time was estimated from the insertion of Veress needle to introduce pneumoperitoneum until application of dressings. Patients were nursed postoperatively, in a general surgical ward, given adequate analgesia and kept well hydrated. Subcutaneous heparin (5000 U, every 8 hours) was discontinued once the patient was fully ambulant. Patients were discharged home once fully ambulant and without any postoperative complications.

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## Results

There were 71 patients (42 males and 29 females), with a mean age of 25 (range from 13 to 58) years. Forty-seven had sickling crises ranging from 1 to 10 (mean 2.1) episodes per year. Five patients had asymptomatic gallstones. The symptoms with which the remaining 66 patients presented are listed in Table 1.

The mean preoperative hemoglobin range was 9 (range 6.3-13.5) g/dL, and the mean fetal hemoglobin (HbF) and sickle hemoglobin (HbS) were 15.5% (range 6.6%-33%) and 72.4% (range 54%-90.9%), respectively.

Fourteen patients needed preoperative endoscopic retrograde cholangiopancreatography (ERCP) for suspicion of common bile duct (CBD) stones. The ERCP was normal in six patients, revealed CBD stones which were successfully extracted in five patients, revealed dilated CBD but no stones in two patients, and revealed papillitis in one patient. Gastroscopy was carried out prior to LC in seven patients with symptoms suggestive of peptic ulceration. This revealed healed duodenal ulcers in two patients, gastritis in three patients and was normal in another two patients.

Fifty-five patients (77.5%) received preoperative blood transfusion (simple transfusion in 42 patients and exchange transfusion in 13). Sixteen patients (22.5%) were given no transfusion (Table 2). The mean operative time was 80 (range 40-270) minutes. Four cases (5.6%) were converted to open cholecystectomy due to difficult anatomy (three), and cirrhosis with varices and dense vascular adhesions (one). There were 10 postoperative complications (Table 3), the majority of which were respiratory, and occurring in patients who had received simple transfusions. All these complications were minor and were treated conservatively. Two of these complications occurred in converted cases. There was only one mortality due to VOC, and this was the same kind of mortality mentioned in our previous reports.<sup>4-6</sup> The median hospital stay was 2.5 (range 1-10) days.

## Discussion

To our knowledge this is the largest series of LC in sickle cell patients with gallstones to date. It is an update of the preliminary experience we previously reported.<sup>4</sup> Since then, another 41 cases have been performed without any mortality, and only minor morbidity. Preoperative blood transfusion in sickle cell patients undergoing any major surgical procedure to reduce the perioperative risks associated with surgery is controversial. Early in our experience, we adopted a simple transfusion policy using packed red blood cells in any patient with a preoperative hemoglobin of less than 10 g/dL. Any patient with a hemoglobin of 10 g/dL or more was given no transfusion regardless of the HbS concentration. None of our first 30 patients received exchange blood transfusion. A single

TABLE 1. Symptoms of sickle cell patients with gallstones.

Symptoms	Number of patients	%
Upper abdominal pain	65	91.5
Nausea and vomiting	56	78.9
Fatty food intolerance	33	46.5
Jaundice	12	16.9
Asymptomatic	5	7

TABLE 2. Distribution of patients with respect to preoperative blood transfusion.

	Number of patients (%)
Transfusion	
Simple	42 (59.2)
Exchange	13 (18.3)
No transfusion	16 (22.5)
Total	71

TABLE 3. Postoperative complications.

Complications	Number of patients
Respiratory (n=6)	
Chest infection	2
Atelectasis	2 (1 converted case)
Acute chest syndrome	2
Wound-related (n=3)	
Wound infection	2 (1 converted case)
Abdominal wound hematoma	1
Sickle crisis	
Vaso-occlusive crisis	1*
Total	10 (14%)

\*Died on the fifth postoperative day.

mortality prompted us to revise our transfusion policy by introducing partial exchange transfusion, especially in patients with severe disease, judged by the number of sickling crises requiring repeated hospital admissions, and by the presence of sickle-related complications, in an attempt to reduce HbS concentration to a level at which VOC is less likely to occur. Our results clearly demonstrate that patients receiving exchange transfusion do far better than those who are given simple blood transfusion (unpublished observation), which contradicts a recent larger randomized multicenter trial<sup>7</sup> that showed simple transfusion to be as effective as exchange transfusion. Furthermore, the former was associated with fewer transfusion-related complications. None of the patients who received exchange transfusion in this series have had any transfusion-related complications (unpublished observations).

Our selection criteria for preoperative ERCP is based mainly on the presence of common bile duct dilatation on ultrasonography and liver function test abnormality. As liver function test in sickle cell patients may be abnormal, we rely mainly on the former. In the laparoscopic era, a

common bile duct dilatation of more than 7 mm is an indication for ERCP. Fourteen of our patients (19.7%) needed preoperative ERCP for suspected CBD stones. It was normal in about half of them, and stones were extracted in over a third of them. We advocate performing papillotomy in any sickle cell patient undergoing ERCP, even if no CBD stones are seen. Seven patients (9.9%) had gastroscopy carried out before LC, only two had evidence of healed duodenal ulcers and three had gastritis. There is no conclusive evidence to suggest that peptic ulcer disease is more common in sickle cell patients than in the general population, despite the depressive nature of this disease and frequent administration of nonsteroidal anti-inflammatory drugs.

In our study, five patients had asymptomatic gallstones. The role of surgery for asymptomatic stones is controversial. While some authors argue against surgery, we<sup>6</sup> and others<sup>8</sup> advocate surgery in young patients with asymptomatic gallstones to avoid future stone-related complications and diagnostic confusion. This view is receiving growing support, especially after the introduction of LC.<sup>8</sup> Median hospital stay of 2.5 days and morbidity of 14% are comparable to those reported for our "non-sickler" population.<sup>5</sup> The reported morbidity associated with open cholecystectomy in patients with SCD approaches 36%,<sup>3</sup> which is much higher than that reported in our series. Two of our complications (atelectasis and wound infection) have occurred in converted cases. The median hospital stay for our converted cases was seven days, i.e., three times that for patients treated laparoscopically. This is quite obvious as laparoscopic procedure abolishes wound-related complications and is associated with rapid convalescence and therefore, shorter hospital stay. It is important to mention that, unlike in other studies,<sup>3,9</sup> none of our 71 patients was nursed in the intensive care unit during the postoperative period. There was no increase in morbidity or mortality.

For the management of sickle cell patients undergoing surgery, the following recommendations are suggested: 1) patients should be jointly managed by surgeons and physicians experienced in dealing with sickle cell patients; 2) patients should be admitted at least three days prior to surgery to determine and organize the need for simple or partial exchange transfusion; 3) patients should be adequately hydrated by setting up an intravenous line the night before surgery; 4) DVT prophylaxis should be administered with premedication and continued

postoperatively until the patient is fully ambulant; 5) prophylactic antibiotics should be administered with the induction of anesthesia and continued into the postoperative period in the event of bile or stone spillage; 6) to minimize the incidence of CBD injury and to reduce the operative time with its attendant risks, LC should be conducted by an experienced laparoscopic surgeon and not by junior surgical staff; 7) factors that trigger VOC should be avoided, e.g., dehydration, acidosis, hypothermia, and sepsis; 8) there should be adequate analgesia, oxygenation, hydration and early mobilization postoperatively; and 9) large amounts of postoperative opiate analgesia should be avoided.

This study proves beyond doubt the safety of laparoscopic cholecystectomy in sickle cell patients. The morbidity associated with surgery in sickle cell patients can be further reduced by the use of preoperative exchange transfusion and minimally invasive surgery.

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