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Prophylactic laparoscopic cholecystectomy in sickle cell patients: Our first experience in Lubumbashi/DRC

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Abstract
Background: Sickle cell disease (SCD) is a hereditary hemoglobinopathy prevalent in sub-Saharan Africa, with significant morbidity due to hemolytic anemia and vaso-occlusive crises. Cholelithiasis, a frequent complication in SCD patients due to chronic hemolysis, often necessitates cholecystectomy. Traditionally, surgery is performed after the onset of symptoms; however, recent evidence supports prophylactic cholecystectomy to prevent severe complications. This study presents our first experience with prophylactic laparoscopic cholecystectomy in sickle cell patients in Lubumbashi, Democratic Republic of Congo (DRC).
Methods: We conducted a prospective observational study at a tertiary care center in Lubumbashi. SCD patients with asymptomatic gallstones identified through routine ultrasound screening were selected. Preoperative optimization included hydration, transfusion protocols, and perioperative care to reduce the risk of sickling. Laparoscopic cholecystectomy was performed under general anesthesia by experienced surgeons. Postoperative outcomes, complications, and recovery time were assessed.
Results: A total of six SCD patients (mean age 21.3 ± 5.4 years) underwent prophylactic laparoscopic cholecystectomy. No intraoperative complications were observed. The average operative time was 65 minutes, and the mean hospital stay was 3.2 days. One patient experienced a mild vaso-occlusive crisis postoperatively, managed conservatively. All patients showed favorable recovery with no readmissions within 30 days.
Conclusion: Our initial experience demonstrates that prophylactic laparoscopic cholecystectomy is a feasible and safe option for sickle cell patients with asymptomatic cholelithiasis in Lubumbashi. With appropriate perioperative management, this approach may help prevent severe gallstone-related complications and improve quality of life in SCD patients.

Keywords: Sickle cell disease, laparoscopic cholecystectomy, prophylactic surgery, cholelithiasis, Lubumbashi, democratic republic of Congo, Hemoglobinopathy, minimally invasive surgery

Introduction

Cholecystectomy is the surgical removal of the gallbladder (GB). It can be performed by conventional means (open surgery) or by video surgery (laparoscopy).

Laparoscopic cholecystectomy (LC), also known as laparoscopic cholecystectomy, is a surgical technique involving laparoscopic removal of the gallbladder. Biliary lithiasis is a frequent pathology in sickle cell disease, characterized by the presence of stones in the gallbladder, which can be complicated by cholecystitis [1].

Sickle cell disease is a common genetic disorder caused by a structural and qualitative abnormality of hemoglobin, characterized by the replacement of normal hemoglobin A by an abnormal hemoglobin called S. It is a chronic, disabling disease with frequent medical and surgical complications. It poses a real public health problem. The world's most widespread genetic disease, it has been recognized as a public health priority since July 2005 by the African Union (AU), UNESCO and WHO, which estimate the number of sickle cell trait carriers worldwide at 120 million [2].

In Africa, it affects between 200 and 300,000 births, with a prevalence of 15% in Senegal, 16%

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in Togo and between 12 and 15% in Mali [3]. Secondary to chronic hemolysis and hyper-bilirubinemia, lithiasis cholecystitis is one of the main abdominal complications of sickle cell disease, making cholecystectomy the surgical procedure most frequently performed in sickle cell patients [4]. The high prevalence, morbidity and lethality of sickle cell disease in Black Africa make this condition a real public health problem. Sickle cell disease is mainly a disease of the black race, with two major areas of origin: sub-Saharan Africa on the one hand, and the Arab-Indian arc on the other [5].

Several studies have demonstrated the involvement of sickle cell disease in the genesis of biliary lithiasis, although the etiopathogenesis is not well elucidated [6]. Laparotomy cholecystectomy is the first abdominal surgical procedure for all sickle cell haplotypes combined. Laparoscopic cholecystectomy has been shown to reduce peri-operative complications, especially in sickle-cell patients [7]. Gallbladder lithiasis (GBL) is a frequent pathology with potentially serious complications. Its management has evolved considerably in recent years, thanks to advances in interventional endoscopy and laparoscopic surgery [1].

Worldwide, numerous studies have been carried out on laparoscopic cholecystectomy in sickle-cell patients: in the USA [8, 9], France [6, 10], Italy [11], Greece [12], Jamaica [13]; Saudi Arabia [14].

In Africa, we can cite Fall B. *et al.* [15] and Diagne *et al.* [7] in Senegal, SANI R. *et al.* [16] and Ayeroue J. *et al.* [5] in Niger, Koueta *et al.* in Burkina Fasso [17], Sangho H. *et al.* in Mali [3], Galiba A. *et al.* in Congo Brazzaville [18]. Following its arrival on the French surgical scene, laparoscopic cholecystectomy has spread spectacularly throughout the world, taking the place of laparotomic cholecystectomy in developed countries. It is not widely used in sub-Saharan Africa, despite the existence of risk factors such as sickle cell disease [19]. This is a disease whose evolution is marked by multiple complications, which underline its seriousness [20].

In the Democratic Republic of Congo (DR Congo), data on laparoscopic cholecystectomy for sickle-cell patients, although already performed in some towns in the country, do not exist. In Lubumbashi, laparoscopic surgery is still lagging behind, and LVBs are still mainly operated on via the conventional route.

Because of the very serious complications of acute sickle cell lithiasis cholecystitis, which are very difficult to distinguish from vaso-occlusive abdominal crises, especially in an African context where emergency ultrasound is not always accessible, prophylactic cholecystectomy may become a necessity when faced with a lithiasis vesicle in sickle cell patients. The aim of our work is to study the results of prophylactic laparoscopic cholecystectomy in sickle-cell patients with presumed uncomplicated vesicular lithiasis, in order to assess its reproducibility.

Results

Epidemiological data

During our study period, 158 laparoscopies were performed for various indications, 98 of which were for LVB, including 54 in sickle-cell patients, i.e. a hospital frequency of 55%. The [15-16] age group was more represented in 30% of cases (N=16), and the mean age was 15±3.2 [8-21y].

The female sex was more represented with 57.4% of cases (N=31) versus 42.6% (N=23) for the male sex, i.e. a sex ratio of 1.3 in favor of the female sex. The majority of patients (72.2%, N=39) came from the city of Lubumbashi.

Table 1: Distribution of patients by age

Age/Years	Effectif(N)	Pourcentage (%) Moyenne
[07-08]	03	5,6
[09-10]	02	3,7 14±3,2 [8-21ans].
[11-12]	06	11
[13-14]	07	13
[15-16]	16	30
[17-18]	11	20,4
[19-20]	05	9,3
[21-22]	04	7,4
Total	54	100

Diagnostic data

Our series shows that the majority of patients (94.4%, N=51) were seen on an outpatient basis and presented with right hypochondrium pain in 94.4% (N=51), associated with jaundice in 72.5% (N=39).

Onset was abrupt in 61% (N=39) of cases, and patients consulted their doctor within six months of the onset of symptoms in 44.4% (N=24).

Our study showed a predominance of blood group O+ with 63% of cases (N=34), and homozygous sickle cell SS represented 65% of cases (N=35).

All our patients had already received a blood transfusion prior to our intervention in 80% of cases (N=43), of whom 18.5% (N=10) were polytransfused.

Table 2: Distribution of surgical patients by mode of admission and reason for consultation

Mode d'admission	Effectif (N)	Pourcentage(%)
En urgence	03	5,6
En ambulatoire	51	94,4
Motif de consultation		
Douleur à l'HD irradiant à l'épaule droite sans ictère	**Effectif(N)** 08	**Pourcentage(%)** 15
Douleur à l'HD irradiant à l'épaule droite + ictère	17	31,5
Douleur à l'HD + ictère	22	41
Douleur à l'épigastre	03	5,5
Douleur à l'HD + fièvre.	04	07
Total	54	100

Pain associated with jaundice was the functional sign found in 57.4% of cases (N=31), and Murphy's sign was positive in 57.4% (N=31) and associated with splenomegaly in 13% (N=13). Murphy's sign was positive in 57.4% (N=31) and associated with splenomegaly in 13% of cases (N=13).

Biological parameters were disturbed in varying proportions, but indirect bilirubinemia was elevated in 21 patients (39%), leukocyte count and CRP were elevated in 33% (N=18), 18.5% (N=10) and 33% (33) respectively.

In our study, 48.1% of patients (N=26) had a hemoglobin level between 7 and 9 g/dl. Ultrasonography diagnosed LVB in all cases, with acute lithiasis cholecystitis leading the way in 50% of cases (N=27).

In our series, various anatomopathological forms were found, including lymphoplasmacytic sclerosing cholecystitis in 27.8% of cases (N=15), and active hypertrophic cholecystitis in 24% of cases (N=13).

Table 3: Distribution of patients by hemoglobin level

Taux d'hémoglobine (g/dl)	Effectif(N)	Pourcentage(%)
4-6	19	35,2
7-9	26	48,1
10-12	06	11,1
13-15	03	5,6
Total	54	100

Therapeutic and evolutionary data

Table 4: Distribution of surgical patients according to perioperative transfusion

Période de transfusion	Effectif (N)	Pourcentage(%)
Peropératoire	02	3,7
Post-opératoire	03	5,5
Per et post-opératoire	10	18,5
Préopératoire (échange transfusionnel)	28	52
Aucune transfusion	11	20,3
Total	54	100

Table 5: Distribution of patients according to operative position and creation of pneumoperitoneum

Position opératoire	Effectif (N)	Pourcentage(%)
Position française	15	27,8
Position de Dubois	39	72,2
Création du pneumopéritoine	**Effectif (N)**	**Pourcentage(%)**
Par l'ombilic (aiguille de Veress)	11	20,3
Par l'Hypochondre gauche	14	26
Open-coelio	29	53,7
Total	54	100

According to our results, 79.7% of our patients (N=43) benefited from transfusion, of whom 52% (N=28) were transfused preoperatively

Technical aspects

In 50% of cases (N=27), the principal surgeon was a specialist in general and laparoscopic surgery. The Dubois position was adopted in 72.2% of cases (N=39), and the first pneumoperitoneum was created by open-coelio in 53.7% (N=29) of cases.

In 70.4% of cases (N=38), three trocars were used to perform the cholecystectomy, and 70% of patients (N=38) benefited from an insufflation time of between 1 and 5 minutes, with a mean duration of 6±0.45 minutes and extremes of between two and fifteen minutes.

Intraoperatively, other pathologies were found, including hepatosplenomegaly in 39% of cases (N=21), followed by digestive adhesions in 31% of cases (N=17).

Cholecystectomy was performed retrograde in 76% of cases (N=41) and anterograde in 24% (N=13), after skeletonization of the vasculo-biliary elements.

The conversion rate was 9.3% (N=05), with sub-hepatic peri-vesicular adhesions (20%), electrical power cuts (20%), material defects (40%) and poor visibility (20%) being the causes of conversion.

The operative incident rate was 15.3%, and gallbladder invasion accounted for 46.7% of operative incidents (N=7). Mean operative time was 67±2.3 minutes, with extremes ranging from 30 to 149 minutes.

Table 6: Distribution of patients by rate and causes of conversion

Taux de conversion	Effectif (N)	Pourcentage (%)
Laparoscopie sans conversion	49	90,7
Laparoscopie avec conversion	05	9,3
Total	54	100
Causes de la conversion	Effectif (N)	Pourcentage(%)
Mauvaise visibilité	01	20
Adhérences sous hépatiques	01	20
Coupure du courant électrique	01	20
Défaut des matériels	02	40
Total	05	100

Evolutionary aspects

The immediate post-operative course was straightforward in 83.7% of cases (N=82), with a complication rate of 16.3% (N=16). Complications were dominated by CVO with 16.7% of cases (N=09), followed by vomiting (7.4%). In 61% of cases (N=82), patients stayed in hospital for three to four days, with an average stay of 3±0.25 days.

Table 7: Distribution of patients by postoperative complications

postoperative complications	Effectif (N)	Pourcentage(%)
Priapisme	01	02
Crise vaso-occlusive (CVO)	04	7,4
Tachycardie (Crise aplasique)	03	5,5
Syndrome thoracique	02	3,7
Distension abdominale	02	3,7
Hémorragie de l'orifice d'entrée du trocart	01	02
Vomissement	03	5,5
Aucune complication observée	38	70,3
Total	54	100

Discussion

Epidemiological data

Sickle cell disease is a public health problem in Black Africa, with prevalence varying from country to country. Pigmentary biliary lithiasis is associated with sickle cell disease in 15-30% of cases before the age of 20 [21], and is linked to hemolytic disease. Although it has established itself as the surgical treatment of choice for acute lithiasis cholecystitis, laparoscopic cholecystectomy remains inaccessible to our populations for economic reasons.

Frequency

During our study period, the frequency of laparoscopic cholecystectomy in sickle cell patients was 55% of all laparoscopic cholecystectomies.

For Kâ O, *et al.* [22] in their study carried out in Dakar, this frequency was 24%.

SALIMOU M. H. [23] found a frequency of 27.45% in Bamako. The frequency of cholecystectomy in sickle-cell patients was 8.4%. Our frequency is higher than those of these authors because in our cohort, we reported cases of sickle cell disease operated on for vesicular lithiasis out of all cases of laparoscopic

cholecystectomy recorded during the study period.

Age of patients

The age range of 15 to 16 years was more represented in 30% of cases (N=16), and the mean age was 15±3.2 [8-21y].

For FALL B. *et al.* [15], patients ranged in age from 7 to 60 years, with an average of 41 years.

In our series, the majority of patients-72.2% (N=39)-came from the city of Lubumbashi, and Congolese nationality was more represented at 84.6% (N=83). It is normal that patients of Congolese nationality were more represented, as the study was carried out in the DRC.

However, there is a notion of ethnicity evoked in the literature regarding the occurrence of LVB. For Buffet C. [25], this syndrome is associated with a mutation in the ABCB4 gene coding for the MDR3 protein. The hereditary nature of lithiasis varies markedly according to ethnic group. In Europe, the genetic share varies from 25 to 30%, and in Hispanic populations from 45 to 65% of lithiasis cases.

Clinical data

Pain associated with jaundice was the functional sign found in 57.4% of cases (N=31), and Murphy's sign was positive in 57.4% (N=31) and associated with splenomegaly in 13% (N=13). Murphy's sign was positive in 57.4% (N=31) and associated with splenomegaly in 13% of cases (N=13). For OMBOTIMBE Allaye A. [26], the most frequent reason for consultation was pain in 89.1% of cases, and was located in the right hypochondrium in 78.1% of cases.

Mehinto D.K. in Cotonou [27] and Guillaume P. in France found hepatic colic to be 68% and 78.8% respectively [28].

Symptomatology can be atypical: intermittent cramp-like pain lasting a few seconds, localized in the right hypochondrium. These are followed by pain-free periods.

Our results corroborate those found by both African and European authors, and are in line with the literature, which recognizes biliary colic or acute biliary pain as the main symptom, characterized in the typical case by a sudden onset of torsion/grinding lasting from a few minutes to a few hours (but less than 6 hours), and located in the right hypochondrium or epigastrium.

Sickle cell phenotypes

Our study showed a predominance of blood group O+ with 63% of cases (N=34), and homozygous SS sickle cells accounted for 65% of cases (N=35).

For Abdoulaye T. [29], the homozygous phenotype was in the majority (80%), 9% heterozygous, 9% composite SC and 2% composite Sβ thalassemia.

This trend is comparable to that of other studies by SANOGO ZZ *et al.* (62% homozygous phenotype) [4].

During sickle cell disease, hyperhaemolysis leads to a decrease in bile acid secretion into the b Paraclinical data

In our series, ultrasound had diagnosed LVB in all cases

In the study by OMBOTIMBE A. [26], hepato-biliary ultrasound was performed in 100% of cases and revealed 69.4% simple vesicular lithiasis and 27.3% lithiasic cholecystitis.

Raveloson J.R. *et al*. reported 58% simple vesicular lithiasis and 35% lithiasic cholecystitis on ultrasound [30].

Ultrasound is the reference examination for suspected vesicular lithiasis, with a sensitivity of over 95%.

In our series, various anatomopathological forms were found, including lymphoplasmacytic sclerosing cholecystitis in 27.8% of cases (N=15), and active hypertrophic cholecystitis in 24% of cases (N=13).

This notion is also corroborated by Parez [6], who reports an 85% rate of cholecystitis on anatomopathological examination, whereas the initial diagnosis of asymptomatic vesicular lithiasis is 53.8% (14 asymptomatic patients out of 26 cases of vesicular lithiasis). Ile. This decrease in bile acid contributes to a reduction in bile solubilization with deposits.

Therapeutic and evolutionary data

In our study, 48.1% of operated patients (N=26) had a haemoglobin level between 7 and 9 g/dl, and 79.7% of our patients (N=43) had benefited from transfusion, of whom 52% (N=28) were transfused preoperatively. ABDOULAYE T. [29], in his study, reported that 46% of patients (N=35) were transfused intraoperatively, with the majority being transfused intraoperatively and postoperatively, i.e. 31.5% of the sample.

In our study, all patients who received transfusions were sickle-cell patients, which could justify the notion that 52 patients in our series were transfused.

We therefore consider that any surgery, particularly abdominal, in sickle-cell patients entails an increased risk of vaso-occlusive complications in the peri-and post-operative period, the most dreaded of which is acute chest syndrome.

Preoperative transfusion has been shown in several studies to reduce acute postoperative complications, but carries a risk of definitive alloimmunization, or even delayed post-transfusion hemolysis, justifying a recent trend towards transfusion economy.

The conditions for deferring transfusion for a simple and frequent surgery such as cholecystectomy are based on a benefit-risk balance, and must be discussed on a case-by-case basis by the sickle-cell physician.

In particular, a prophylactic preoperative transfusion seems highly justified in patients with a history of recent vaso-occlusive crisis or acute chest syndrome (within 6 months preoperatively), and those undergoing emergency surgery, who are particularly at risk of postoperative events.

Technical aspects

In 50% of cases (N=27), the principal surgeon was a specialist in general and laparoscopic surgery. The Dubois position was adopted in 72.2% of cases (N=39).

In the Meta-analysis by Ravendran K *et al.* [31], all cholecystectomies were performed in the “French position”, i.e. with the legs spread for positioning the main surgeon.

The “French position” is the best indicated, as it puts the operating team at ease by avoiding overlapping of hands during the operative procedure. This remains true for adult patients, unlike in our series where the majority were young patients for whom the French position could not be applied due to discomfort.

The first pneumoperitoneum was created by open-coelio in 53.7% (N=29) of cases.

In laparoscopic surgery, 50% of serious accidents occurred during puncture with the Veress needle to create the pneumoperitoneum and insert the first trocar.

This is why open laparoscopy is the rule in the practice of many teams, and all trocars are placed under direct vision to avoid the accidents described during introduction of the first trocar.

Type of cholecystectomy performed

Cholecystectomy was performed retrograde in 76% of cases (N=41) and anterograde in 24% (N=13), after skeletonization of the vasculo-biliary elements.

Anterograde cholecystectomy was performed in cases of multi-adherent gallbladder and anatomical anomalies of the cystic duct and artery, whereas when the gallbladder approach is easy, the retrograde route is adopted by many surgeons.
Retrograde cholecystectomy was performed in 72.7% of cases in the OMBOTIMBE study [26].
For SANGARE *et al.* [32], removal of the gallbladder from the liver bed was retrograde in 271 cases (80%) and anterograde in 69 cases (20%).

Conversion rate and causes
In our study, the conversion rate was 9.3% (N=05), with sub-hepatic peri-vesicular adhesions (20%), electrical power cuts (20%), material defects (40%) and poor visibility (20%) being the causes of conversion.
The rate of conversion to laparotomy was 4.5% in the study by Bray Madoué *et al.* [24], and the main reason for conversion was difficulty in exposing Calot's triangle.
In Burkinafasso, Bounkoungou *et al.* [33] obtained a conversion rate of 12.5%. The main reasons for conversion were cystic artery haemorrhage, perivesicular adhesions and difficulty in exposing Callot's triangle. For DIDIER James *et al.* [34], the conversion rate to laparotomy was 6.55% (4 cases).
In the study by SANGARE *et al.* [32], the conversion rate was 5.3% of cases, and observed at the start of the experiment (5.3%).
The reasons behind these conversions were sometimes technical failures (suction, electricity, etc.), and also the application of their principle of converting whenever a procedure was not progressing after 30 minutes. In their service, conversion is not a failure but an additional safety measure. According to Randoux [35], the conversion rate decreases with team experience.
Conversion should be considered by the surgeon and the duly informed patient as a proof of prudence rather than a technical or personal failure. This decision must be taken quickly, as conversion delayed beyond 50 minutes increases postoperative morbidity, particularly respiratory morbidity [35].
It is in line with a basic surgical principle that teaches the need to enlarge the surgical approach in the event of technical difficulty [35].
Although the surgeon's experience represents a determining factor in the use of laparoscopy, it is nevertheless difficult to give a figure for laparoscopic cholecystectomy that would enable a surgeon to be described as "experienced", since experience includes laparoscopic cholecystectomy but also other types of procedures performed under laparoscopy during which the surgeon improves the handling of instrumentation specific to this approach.

Intraoperative incidents
The operative incident rate was 15.3%, and gallbladder invasion accounted for 46.7% of operative incidents (N=7).
SANGARE *et al.* [32] recommend careful dissection with a hook to prevent accidental opening of the gallbladder and spillage of bile into the peritoneum.
The frequency of occurrence of biliary wounds varies from 0.2% to 0.6%, and only 29% of these lesions are recognized intraoperatively [31]. Some of these iatrogenic lesions go unnoticed, and are recognized in the postoperative period in around 0.1% of cases [6].
According to MOREAUX [36], in vesicles with a healthy wall, the thinness of the wall and poor mastery of basic gestures favour perforation of the VB.
Generally speaking, however, vesicular perforation occurs mainly when the vesicle is very pathological, with a more or less necrotic wall.
In our experience, the learning curve has helped to neutralize any accidents.
We insist on performing a follow-up abdominal ultrasound to check for a sub-hepatic collection, or even a second look, in the event of postoperative pain resistant to a level 2 analgesic.
Dissection of Calot's triangle is an essential part of cholecystectomy. The many anatomical variations of the cystic pedicle and the main bile duct mean that we avoid any section before we have a clear view of the vesicular pedicle. Sectioning of the cystic duct and artery should only be performed after a clear anatomical presentation.
Bray Madoué *et al.* [24] report 4 patients (18.2%) with gallbladder perforation during dissection.

Duration of operation
In our series, the mean operative time was 67±2.3 minutes, with extremes ranging from 30 to 149 minutes. Bray M. *et al.* [24] reported a mean operating time of 90 minutes, with a range of 38-142 minutes.
With the same level of experience, poor-quality instruments increase the duration of the procedure. Certain operative difficulties also contribute to longer operating times. These include major adhesions and scleratrophic vesicles.

Evolutionary aspects
In our series, the immediate postoperative course was straightforward in 83.7% of cases (N=82), with a complication rate of 16.3% (N=16). Complications were dominated by CVO with 16.7% of cases (N=09), followed by vomiting (7.4%).
Bray M. *et al.* [24] reported a complication rate of 9.1% in their series.
For Abdoulaye T, [34], postoperative follow-up was straightforward in 95% of patients. Morbidity was 5.2% (two CVOs, one priapism and one severe bradycardia) and mortality 5%. The average length of stay in the intensive care unit was 24.75 hours.
Meyer [37] and Pessaux [38] report postoperative surgical complication rates of 4% and 12.5% respectively.
Laparoscopic complication rates differ from author to author, but remain generally low, in contrast to our results, which report a complication rate of 16.3%, higher than those of the authors consulted.
Apart from the learning curve, most of these operative traumas of the biliary tract occur in high-risk procedures, with the presence of known local factors, essentially acute or sclero-atrophic cholecystitis or an extra-hepatic biliary anomaly. These risk factors were found in 40% and 61% of patients respectively in these two French clinical series.
While laparoscopic biliary surgery has its advantages, it also has its disadvantages, which can lead to serious complications.

Hospital stay
In 61% of cases (N=82), patients stayed in hospital for three to four days, with an average stay of 3±0.25 days.
For Bray M. *et al.* [24], the average hospital stay was 3 days, with extremes ranging from 2 to 6 days.
In Africa, Haithem Zaafouri *et al.* [39] experimented with outpatient laparoscopy. Three randomized clinical trials compared outpatient laparoscopic cholecystectomy with cholecystectomy requiring overnight hospitalization, and demonstrated the feasibility of outpatient laparoscopic cholecystectomy.

James Didier *et al.* [34] reported a mean hospital stay of 4.3 days, with extremes ranging from 2 to 10 days, in group 1, versus 1.7 days, with extremes ranging from 1 to 7 days, in group 2. Mortality was zero.

In our context, where the practice of laparoscopy is not yet widespread, we have often encountered opposition from patients to early discharge. In our series, however, patients were reassured by the absence of pain, and readily agreed to go home early.

Haithem Zaafouri *et al.* [39] support the idea that laparoscopic cholecystectomy is reserved primarily for the management of symptomatic gallstones, but there is considerable controversy as to whether it should be performed as outpatient surgery or as part of an overnight hospital stay, in terms of patient safety.

We agree with several other authors that CL lends itself well to outpatient surgery because of its short duration, the rarity of immediate complications and the absence of gastrointestinal transit disturbance, but for sickle cell patients, it is preferable that a 48-hour observation period be instituted to detect immediate postoperative complications.

Conclusion

Laparoscopic cholecystectomy is a safe technique in sickle-cell patients with low morbidity, provided it is performed in the absence of signs of cholecystitis.

In view of its good results and the high morbidity and mortality of emergency surgery in sickle-cell patients, we feel that it should be the standard for presumed uncomplicated vesicular lithiasis.

This recommendation is even more valid in our African context, where vaso-occlusive abdominal crises are difficult to distinguish from complications of vesicular lithiasis in the absence of rapidly available emergency ultrasound.

Acute complications such as acute cholecystitis, angiocholitis and acute pancreatitis can be life-threatening in children with sickle cell disease. The evolution of asymptomatic vesicular lithiasis in sickle-cell patients leads spontaneously to acute complications such as hepatic colic, acute cholecystitis and choledochal lithiasis.

Moreover, cholecystectomy for acute cholecystitis, more than cold cholecystectomy, is fraught with high morbidity and a high conversion rate in homozygous sickle-cell patients.

These observations lead us to agree with most authors that prophylactic cholecystectomy should be proposed in homozygous sickle-cell children to avoid the heavy toll of emergency surgery in a field debilitated by hemoglobinopathy, young age and, above all, malnutrition in our African context. A longitudinal analytical study should be considered in our setting to try to determine the short-, medium-and long-term results of prophylactic cholecystectomy in sickle cell patients

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