A Trial to Plan Management of Cholelithiasis According to Presenting Feature in Pediatric Age (Experience with 30 cases).

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Background/Purpose: Biliary the prevalence of gallstones in the pediatric population has been reported to be between 0.13% and 0.22%. Children with symptomatic gall stones present most commonly with right upper quadrant pain followed by nausea or vomiting; jaundice and epigastric tenderness are less frequent. Gallstones can be asymptomatic in 17% of children. Medical therapy is ineffective in children with symptomatic cholelithiasis. Cholecystectomy is the treatment of choice. Laparoscopic cholecystectomy is now getting widely practiced in children.

Materials & Methods: This prospective study was conducted between 2004 and 2009 on 30 children diagnosed as having gallstones by abdominal ultrasound. Exclusion criteria include active infection as cholangitis, and severe anemia or thrombocytopenia in hemolytic cases. Age ranged between 4 month and 14 years. Nineteen patients were males and 11 were females. Fifteen patient (50%) were referred from the hematology clinic, the other 15 (50%) were either referred from hepatology clinic or other clinics, diagnosed incidentally during abdominal ultrasound examination. Laparoscopic cholecystectomy was performed to 20 patients, open approach to 8 and conservative management on 2 cases. Intraoperative cholangiography was conducted on 4 cases and revealed no stones in the common bile duct. Follow up period ranged from 6 month to 2 years.

Results: This prospective study was conducted on 30 patients, 20 having gall stones, 20 cases were operated upon using laparoscopy for removal of gall bladder. 8 cases 27% with conservative approach, and 2 cases 6.6% were managed conservatively. No mortality was recorded. No major morbidity. 3 of the cases for which open cholecystectomy were of the hemolytic anemia group for which concomitant splenectomy was done.

Conclusion: Cholelithiasis is a condition in pediatric age of increasing prevalence. Cholecystectomy is the standard procedure for its management. Laparoscopic cholecystectomy is safe and effective in children.

Index Word: Cholelithiasis - laparoscopic cholecystectomy-pediatric age group.

INTRODUCTION

Cholelithiasis is a well established disorder in the pediatric and must be considered in the differential diagnosis of recurrent abdominal pain in children. Although uncommon during the first years of life, it is being diagnosed with increasing frequency in neonates and infant, probably because of wide spread use of ultrasonography.

The increased rate of diagnosis may be related to a true increase in the incidence of the disease or, more likely, to an enhanced ability to detected gall stones.
The prevalence of gallstones in pediatric population has been reported to be between 0.13% and 0.22%. However, in children who undergo an abdominal sonogram for abdominal pain, the incidence of gallstones and sludge has been reported to be as high as 1.9%. Many authors report a slight preponderance for boys among preadolescents with Cholelithiasis, however this is completely reversed in adolescents.

Etiology of the condition is a subject discussed by many authors. The majority of gall stones in children is believed to be idiopathic and several series suggest that only 20% of gallstones are related to hematological diseases.

Risk factor for the condition include total parental nutrition, ileal resection and ileal disorders, cystic fibrosis, family history of gall stones, biliary tract anomalies, and medications (cyclosporine, ceftriaxone).

Gallstones can be classified as pigment, cholesterol or mixed type stones. Pigment stones are usually detected during infancy and early childhood and associate hemolytic disorders, while cholesterol and mixed type stones are more common among adolescents.

The condition may present by right upper quadrant pain (75-85%), followed by nausea or vomiting (60%). Jaundice is less frequent and epigastric tenderness is present in one third of patients. cholelithiasis can be asymptomatic in 17% of children.

Choledocholithiasis is recorded to be between 5% and 18% among patients with gallstones in some reports. Some authors report even a higher incidence (26%) in patients with hematological disorder and may be related to the small size of pigment stones which allow them to pass to the common bile duct easily.

Acute cholecystitis complicates biliary stone disease in 3%-14% of cases, and the diagnosis is based on Murphy's triad which comprises right upper quadrant pain, fever, leucocytosis. Cholangitis present with the same picture but with jaundice. Gallstone pancreatitis has been detected in 7% of patients with biliary stone disease.

**PATIENTS AND METHODS**

This prospective study was performed in Cairo university pediatric hospital between 2004-2009. It was conducted on 30 pediatric patients, their age ranged between 4 months and 14 years, the mean age was eleven years. Most of the patients were referred from hematology department, some cases were referred from hepatology clinic and others came directly to the pediatric surgery outpatient clinic. Fifteen cases were with hemolytic disorder.

The diagnosis of cholelithiasis was made by ultrasonographic examination in all cases. We were following the management protocol described in the algorithm in (Fig.1).

Preoperative management included correction of anemia (2 cases with sickle cell with severe anemia were given blood transfusion and were operated upon after improvement of their blood profile). Cases with cholangitis (one case) or calculus pancreatitis were treated and postponed till subsidence of the attack.

Laparoscopic cholecystectomy was performed on 20 cases. In all cases, the open approach (Hasson's technique) was adopted for air insufflation. In the first 5 cases, the 4 port technique with 10 mm port at the umbilicus and a 5 mm port at the other 3 sites (epigastric, right midclavicular and right anterioaxillary). In the latter cases, the 2 right instruments were portless (stab) incision in which instrument is not removed. In young children below 6 years, there is some modifications that can be done to ease the maneuver: the most right port can be moved inferriorly that it can approach the right inguinal crease, the port on the epigastrium is moved slightly to the left to widen the angle and to avoid swording between working instruments. Two cameras, 0 º lens are used, 10 mm and 5 mm, to allow for exchange when using clip applier through the 10 mm port.

The insufflation pressure was below 10 mmHg in children below 6 years, 12 mmHg for children between 6-12 years, and 14 mmHg in pre adolescents (same for adults). Intraoperative hypercarbia was avoided by hyperventilating the patient.

In cases where open cholecystectomy is carried on, cholecystectomy with transverse infracostal incision with its centre on mid clavicular line, and using fundus first approach. In cases where splenectomy...
was done concomitantly, another left transverse subcostal incision is done. In all cases of cholecystectomy whether laparoscopic or conventional, a tube drain was left in the hepatorenal pouch till the effluent becomes clear.

Follow up period for all the cases was at least 6 months (range from 6 months to 2 years postoperatively).

Fig. 1: an algorithm for planning management of cholelithiasis according to presentation:

The algorithm described is a trial to plan the management of the condition according to the presenting features, the follow up and expectant management when indicated must be followed without any hesitation with surgical solution if necessary. Complications like cholecystitis, pancreatitis or Cholangitis are managed by cholecystectomy once the patient’s condition is stabilized. ERCP is considered to be a step mostly needed with complications when common bile duct stone is expected with its squealer but is not considered as a definitive management.

RESULTS

The study was conducted on 30 children diagnosed as having gallstones, 19 males and 11 females.

Laparoscopic cholecystectomy was performed to 20 patients and open Cholecystectomy to 8 patients and 2 patients were followed up for 6 months on ursodeoxycholic acid and repeated U/S every 2 months till their U/S revealed gall bladder free of
stones and those 2 cases were below one year and 
they are still on follow up.

Operative time for the laparoscopic cholecystectomy 
was between one hour and 2.5 hours, mean operative 
time was one and half hour.

Conversion to open cholecystectomy was undertaken 
in two cases due to anesthetic problems and 
unexplained hypercarbia in one case and the other 
due to bleeding from cystic artery with a very short 
stump and for fear of coagulating the right hepatic 
artery.

Mean time for the open cholecystectomy was 50 
minutes for the procedure itself and 2 patients with 
sickle cell disease needed concomitant splenectomy 
for hypersplenism, both patients needed blood 
transfusion preoperatively and postoperative hospital 
stay for one week to stabilize general condition and 
with respiratory support to guard against acute chest 
syndrome. A third patient with hereditary 
spherocytosis needed splenectomy for hypersplenism

The other 4 patients for which open cholecystectomy 
was done had history of recurrent attacks of right 
upper quadrant pain with history of attacks of 
hyperbilirubinemia, 3 of them were negative for their 
cholangiography and the fourth showed small stone 
that was extracted and analyzed and revealed black 
pigment type.

One case was done on the emergency department and 
was diagnosed as having acute abdominal pain for 
which suspicion of acute appendicitis in a 4 year old 
child, RT transverse supraumbilical incision revealed 
grossly normal appendix, and cholecystitis detected 
by serositis and edema intraoperatively.

Ultrasound was performed and revealed gall stones, 
cholecystectomy and appendectomy were done.

One case had calcular pancreatitis diagnosed by 
elevation of amylase & lipase & was subjected to 
ERCP and sphincterotomy but no stones was revealed 
at time of ERCP for which laparoscopic 
cholecystectomy was performed after complete 
remission (one month)

No port site hernia, no case showed major bile leak, 
one case revealed bile of about 50 cc daily from the 
drain for 5 days and the drain was removed 2 days 
later (one week) when the effluent became nil, 
infection at epigastric port from which gall bladder 
was extracted and was treated by antiseptics and oral 
antibiotics

No major biliary leaks or injury to common bile duct 
and no mortality.

Post operative hospital stay ranged from 2 days to 7 
days with mean of 3 days.

**DISCUSSION**

Cholecystitis and cholelithiasis are being diagnosed 
with increasing frequency in infancy, childhood and 
adolescence and the incidence is reported to be 
between 0.15 & 0.22%. 2,3,4. The prevalence of the 
condition cannot be estimated accurately as many 
cases are asymptomatic. The condition may present 
by symptoms as upper right quadrant pain nausea or 
vomiting or by complications (cholecystitis, 
pancreatitis Cholangitis). The relatively frequent use 
of abdominal ultrasound in children with abdominal 
disorders recently has resulted in the diagnosis of 
gallstones in large number of asymptomatic children 
and despite they comprise 17% of children with 
gallstones, very little information exists regarding the 
appropriate management 7,8.

An entity which needs to be discussed is biliary 
dyskinesia which is a syndrome characterized by 
biliary colic without evidence of cholelithiasis or acute 
cholecystitis ,the diagnosis can be aided by a 
decreased gall bladder ejection fraction upon 
cholecystokinin dimethyl iminodiacetic acid scanning 
(CCK-HIDA).20

Although laparoscopic cholecystectomy is the 
treatment of choice in adults, the diagnosis and 
management and outcome is less clear in children.

No case was referred as diagnosed to be biliary 
dyskinesia, and this item needs to be in mind to be 
diagnosed.

In this study, 2 patients less than one year were 
followed up for 6 months under medical treatment, 
with repeated ultrasound every 2 months. It was 
noticed that the stones disappeared after 6 months of 
follow up, it is reported that dissolution occurs in up 
to 50% of neonates and infants in some series.21,22,23
Jawad et al. recommend observation of asymptomatic infants for 3 to 6 months and if there is failure of resolution of stones or become calcified, cholecystectomy is recommended by laparoscopy.

Kumar et al. reported their experience on 102 patients with cholelithiasis between 1979 and 1996 were 81 patients underwent open cholecystectomy (OC) and 7 patients underwent laparoscopic cholecystectomy (LC) Gallstones resolved completely in 6 out of 14 patients treated nonoperatively, 82 of 88 patients treated operatively remained asymptomatic with follow up period of 9 years. Wesdorp et al. reported long term follow up of 50 of 82 children with cholelithiasis or choledocholithiasis, a total of 18 of 34 symptomatic patients undergoing either cholecystectomy or ERCP developed recurrent symptoms after a mean follow up period of 4.6 years. it was noted that recurrent symptoms occurred more commonly in patient undergoing ERCP alone. Esposito et al reported long term follow up of 110 symptomatic children underwent laparoscopic cholecystectomy and there were no serious early or long term complications in a period follow up of 1-5 years. Holocomb and colleagues published their experience on 100 children underwent LC between 1990 and 1998 and reported a single wound infection and the majority had no long term complications.

St Peter et al. recently published their retrospective study on 224 underwent LC and concluded that LC is safe and effective in children and that the incidence of complicated gallstone disease appears less common in children as most cases present with symptomatic cholelithiasis without active inflammation that accounts for the very low rate of ductal complications and they stressed on that biliary dyskinesia is becoming more frequently diagnosed in children and respond favorably to cholecystectomy.

CONCLUSION

Biliary stones disease has become more common in children and is often idiopathic, asymptomatic children with non calcified gallstones and without associated comorbidities can be managed expectantly especially in the very young population (below one year).

Symptomatic gallstones should be managed promptly especially in the hemolytic patients. Laparoscopic cholecystectomy is safe and effective in the pediatric age and should be into the practice of pediatric surgeons.

REFERENCES

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