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Comparative study of Fundus first and Retrograde Cholecystectomy at a tertiary care centre in Northern India

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Abstract

Introduction

Gall stone disease is a common clinical problem. The prevalence varies greatly with age, sex, country and ethnic group. It is a disease primarily of middle aged and elderly adults. An increasing number of patients over 60 years of age are being operated upon for cholelithiasis.

Cholecystectomy is the most common elective operation performed by general surgeons through the world.

Materials and Methods

The study was based on 50 cholecystectomy case operated at Guru Nanak Dev Hospital, Amritsar. Two groups were made- Group A included the patients in whom cholecystectomy with fundus first method was done and group B included the patients in whom cholecystectomy with duct first method was done. The results of the two were compared.

Results

The results were based on age, sex, associated disease, USG finding, type of incision, look of gall bladder, colour of aspirate, thickness of gall bladder, operative diagnosis, adhesions, anatomical anomalies, peroperative complication, technical difficulty time taken during the surgery, drainage and post operative complication.

Conclusion

The study concluded that retrograde cholecystectomy should be the first preference. However in difficult cases, it is wise to combine this with fundus first method of cholecystectomy, so as to minimise injury to the structures in the Calot's triangle.

Keywords: scapula, glenoid cavity, morphology, shoulder arthroplasty.

Introduction

Gall stone disease is a common clinical problem. The prevalence varies greatly with age, sex, country and ethnic group. It is a disease primarily of middle aged and elderly adults. An increasing number of patients over 60 years of age are being operated upon for cholelithiasis. Gall stones are extremely common in Chile and Scandanavian countries. Women develop stones more than twice as often as men. An increased risk for gall stones is associated with number of pregnancies, oestrogen replacement therapy, use of oral contraceptives, obesity and rapid weight loss. In India the incidence of gall stones is much more in North India as compared to South India. It is notably high in West Bengal where 25. 9% of all surgical patients are accounted for by it.[1] A fairly high incidence of 10% of total hospital admissions has been reported from Kashmir.[2] 10% of major surgical operations in Chandigarh are on biliary tract.[3] The incidence of the disease is relatively low in Bombay region.[4]

Cholecystectomy is the most common elective operation performed by general surgeons throughout the world. The increasing acceptance of surgical therapy for gall stone disease and its consequences over the past 100 years is the result of many factors including the availability of accurate methods of diagnosis, the safety and ease with which the operations are accomplished and the satisfactory long term relief of symptoms and interruption of pathological process involved.

The medical community is experiencing a dramatic change in the way the calculus disease of the biliary tract is treated Safe and effective treatment of gall stones is under renewed scrutiny with the development of non surgical methods such as stone dissolution, fragmentation techniques and percutaneous stone removal. Cholecystectomy is still the mainstay of treatment for symptomatic gall stones with a low overall morbidity and mortality The operative mortality rate in cholecystectomy is less than 1%.[5]
Cholecystectomy is the second most frequently performed abdominal operation. It is exceeded in frequency only by laparotomy for removal of appendix. It is however, a potentially difficult operation. Biliary tract surgery has gained the respect of all experienced surgeons who realize that it can at times be most complicated of all. On occasion, it can test the skill of even the most experienced surgeon Surgery in gall bladder disease is thought to be difficult mainly because of two reasons One. the dissection has to be carried out in the region of Calot's triangle in the vicinity of vital structures and the dissection has to be careful and meticulous Secondly, there are varied anomalies of the structures in this region which if not known can lead to disaster. Severe fibrosis associated with inflammation can also distort the anatomy in this region. The common bile duct, common and right hepatic ducts and the right hepatic artery all are at risk of damage. So thorough knowledge of anatomy and variations in the region, is of paramount importance.

With modern improvements in pre-operative and post-operative care, a more aggressive surgical approach to calculus and inflammatory disease of the gall bladder has evolved. Well trained surgeons and ancillary specialists are becoming available in many community hospitals not connected with major medical centers It is of value for any surgeon or group of surgeons to review periodically his or their experiences with surgery of biliary tract. It is important to know the actual operative mortality, the incidence of complications and the number of and reasons for unsatisfactory results following cholecystectomy.

Materials and Methods

The present study was aimed:-

1. To compare the results of cholecystectomy by two different methods.
2. To find out how safe is the fundus first method of cholecystectomy.

For this purpose, patients admitted in Surgical Units of Guru Nanak Dev Hospital/Govt Medical College, Amritsar in whom cholecystectomy was done- formed the material for the study. These patients were examined

thoroughly and investigated. Two groups of 25 patients each were framed- group A and group B.

Group A included the patients in whom cholecystectomy with fundus first method was done and group B included the patients in whom cholecystectomy with duct first method was done. Various operative difficulties, vascular anomalies, duct anomalies and complications by two methods were noted. Also post-operative complications were noted and then inferences drawn.

Results

The present study was conducted on 50 patients of gall stone disease who were admitted in the Surgical Units of Guru Nanak Dev Hospital/Medical College. Amritsar.

Two groups of 25 patients each were made and labelled as group A and group B. All these patients underwent cholecystectomy. In group A. cholecystectomy was performed by Fundus First Method and in group B cholecystectomy was performed by Duct First (Retrograde) method. Cases were selected at random and following significant observations were made.

Table 1 Showing look of the gall bladder

Colour of gall Bladder	Group A		Group B	
	No. of cases	%age	No. of cases	%age
White opaque	17	68	15	60
Bluish green hue	07	28	09	36
Congested and oedematous	01	04	01	04
Total	25	100	25	100

Look of gall bladder

Immediately, after opening the abdomen a look on the condition of gall bladder was made. Table 1 shows that in group A. in 17 (68%) cases, gall bladder was white and opaque whereas in 7 (28%) cases, it was of bluish green hue. It was congested and oedematous in 1 (4%) case. On comparing with group B. it was noted that in group B gall bladder was white opaque in 15 (60%) cases. In 9 (36%) cases it was of bluish green hue and in 1 (4%) case in group B also it was congested and oedematous.

Table 2 Showing colour of aspirate

Colour of aspirate	Group	A	Group B	
	No. of cases	%age	No. of cases	%age
Viscid green bile	16	64	17	68
Thick dark brown bile	06	24	05	20
Mucus	03	12	02	08
Mucopurulent	-	-	01	04
Total	25	100	25	100

Colour of aspirate

On having a look at table 2, it is observed that in 16 (64%) cases of group A. when the gall bladder was aspirated viscid green bile was received whereas in 6 (24%) cases bile was of thick dark brown colour In 3 (12%) cases of group A, mucus was aspirated. Now on looking at the figures of group B, in 17 (68%) cases viscid green bile was aspirated where as thick dark brown bile was aspirated in 5 (20%) cases. In 2 (8%) cases of group B. mucus was aspirated and in 1 (4%) cases, mucopurulent aspirate was there.

Table 3 Showing wall thickness of gall bladder (per-operative)

Thickness of wall of gall bladder in mm	Group A		Group B	
	No. of cases	%age	No. of cases	%age
Upto 3 mm	16	64	18	72
3.0 - 5.0 mm	09	36	07	28
Total	25	100	25	100

Wall thickness of gall bladder

Gall bladder was cut and its wall thickness was measured immediately in operation theatre before fixing it in formalin. As is evident from Table 3 thickness of wall of gall bladder was upto 3.0 mm in 16 (64%) cases in group A and in 18 (72%) cases in group B, it was from 3 0-5 0mm in 9 (36%) cases in group A and 7 (28%) cases in group B.

Table 4 Showing adhesions of G.B with surroundings

Adhesions	No. of patients	
	Group A	Group B
With greater omentum		
• Filmy	4	3
• Dense	1	2
With stomach		
• Filmy	1	0
• Dense	0	0
With colon		
• Filmy	0	0
• Dense	0	0
With duodenum		
• Filmy	2	1
• Dense	0	1
Adhesion in Calot's triangle		
• Filmy	15	17
• Dense	6	5

Adhesions

As evident from Table 4 adhesions of gall bladder were present with surrounding structures. In group A, in 5 cases there were adhesions between gall bladder and greater omentum. In 4 cases these were filmy and in 1 case they were dense. In one case there were filmy adhesions with stomach and in two cases there were filmy adhesions with duodenum. In group B, in 5 cases adhesions were found with greater omentum, out of which in 2 cases they were dense and in three cases they were filmy In 2 cases adhesions were found with duodenum, out of which in one case they were dense and in another one they were filmy. Filmy adhesions were found in Calot's triangle i.e. between infundibulum of gall bladder and common bile duct in 15 (60%) cases in group A and 17 (68%) in group B adhesions were dense in 6 (24%) cases in group A and 5 (20%) cases in group B. Dissection was difficult in cases with dense adhesions in Calot's triangle in both the groups

Peroperative complications

On closely analysing the observations in table 4, we found that in 17 (68%) cases in group A, there was moderate bleeding i.e., bleeding was obscuring the operative field whereas in 7 (28%) cases it was mild i.e.. just ooze only, not obscuring operative field. Only in 1 (4%) case in group A bleeding was severe. It was due to injury to cystic artery. On comparing the observation with group B, we found that there was mild bleeding in 20 (80%) cases where as in 5 (20%) cases bleeding was moderate and that too only from gall bladder bed Then regarding separation of gall bladder from the liver, it was easily separated from the liver in 19 (76%) cases in group A and 20 (80%) cases in group B. Separation was difficult in 6 (24%) cases in group A and 5 (20%) cases in group B. There was no injury to duct in any case of both the groups. In 4 cases in group A the gall bladder got ruptured while operating and this complication occurred in only one case in group B.

Table 5 Showing time taken during surgery

Time in minutes	No. of patients	
	Group A	Group B
31-40	02	04
41-50	08	12
51-60	10	07
61-70	02	01
71-80	03	01
Total	25	25

Time taken during surgery

It is clear from Table 5 that in 10 (40%) cases in group A, it took 31-50 minutes to complete the operation whereas in group B this figure was 16 (64%). Again in another 10 (40%) cases the time taken in group A was 51-60 minutes whereas in group B 7 (28%) cases could be finished taking this much time. oN further analysis of the table 5. we found that in 5 (20%) cases of group A, the time taken was between 61-80 minutes whereas this much time was taken to finish 2 (8%) cases of group B.

Table 6 Showing number of days after which drain was removed

Drain removed	No. of patients	
	Group A	Group B
On 2nd postoperative day	04	03
On 3rd postoperative day	14	13
On 4th postoperative day	03	01
On 5th postoperative day	01	-

Drainage:

On analysis of the table 6 it is clear that in 18 cases in group A, drain was removed by 3rd postoperative day whereas in 4 cases it was kept till 4th to 5th post-operative day. In group B. in 16 cases the drain was removed by 3rd post-operative day. Only in 1 case of group B. it was kept till 4th post-operative day.

Table 7 Showing post-operative complications

Post-operative complications	No. of patients	
	Group A	Group B
Nausea and vomiting	07	06
Wound sepsis	02	02
Seroma	04	05
Chest infection	-	-
Persistence of pain	-	-

Post-operative complications

Table 7 shows various complications encountered during post-operative period. In 7 (28%) cases nausea and vomiting occured in group A and in 6 (24%) cases in group B. Wound sepsis occured in 2 (8%) cases in group A and same is the figure in group B Seroma formation at incision site was there in 4 (16%) cases in group A and 5 (20%) cases in group B. Complications like chest infection and persistence of pain were not seen in any case in both the groups.

Discussion

The cholecystectomy is commonly performed by retrograde method and sometimes fundus first method of cholecystectomy is also used . In the present study, an attempt has been made to compare the two methods of cholecystectomy i.e. fundus first and retrograde method in order to find easy and safe technique of cholecystectomy among the two methods. Cases were divided into two groups of 25 patients each and the groups were designated as group A and B. In group 'A', cholecystectomy was performed by fundus first method and in group B. retrograde method was employed to perform cholecystectomy.[6]

Look of gall bladder

As shown in Table 1, in 17 (68%) cases of group A gall bladder was of white opaque colour In 7 (28%) cases the gall bladder was of bluish green colour. It was congested and oedematous in 1 case. Similarly the corresponding figures in group B are 15. 9 and 1 respectively. The cases with bluish green colour of gall bladder had minimal adhesions and cholecystectomy was comparatively easy whereas opaque gall bladder was representative of chronicity and dense adhesions of varying degree with the surrounding structures where present made cholecystectomy difficult. On analysis of the

figures it can be concluded that cholecystectomy could be performed by both the methods as regards the colour of gall bladder is concerned.[7]

Colour of the aspirate

As depicted in table 2 viscid green bile was recovered from 16 cases in group A and 17 cases in group B Aspirate was of thick dark brown colour in 6 cases in group A and 5 cases in group B Mucus was aspirated in 3 cases in group A and 2 cases in group B Only in 1 case in group B the aspirate was mucopurulent. So it can be concluded that the colour of the aspirated material makes no difference as far as method of cholecystectomy is concerned The colour of aspirate from gall bladder had no bearing on surrounding adhesions except where it was mucopurulent and that patient had oedematous congested gall bladder representing empyema.[8]

Thickness of gall bladder (peroperative):

As is shown in table 3 wall of gall bladder was less than 3.0 mm thick in 16 cases in group A and 18cases in group B. It was 3.0-5.0 mm in 9 cases in group A and 7 cases in group B. Chance of rupture of thin walled gall bladders while operating was more in fundus first method of cholecystectomy as compared to duct first method of cholecystectomy.[9]

Adhesions

As is evident from table 4 adhesions of gall bladder were found with surrounding structures at the time of operation. In some cases these were filmy and in others these were dense. Filmy adhesions could be separated easily with blunt dissection whereas there was some difficulty in separating dense adhesions. Dense adhesions were present with greater omentum in 1 case of group A and 2 cases of group B. While separating the adhesions there was mild to moderate bleeding. This bleeding in group A slightly obscured the operative field. So there was some difficulty in carrying out cholecystectomy in group A where separation of gall bladder produced more bleeding and thus interfering with the clear view of operative field. So it can be concluded that where ever operative field is obscured with bleeding cholecystectomy by duct first method can be performed with ease because cystic artery is ligated first and thus bleeding is brought under control. In patients with dense adhesions in Calot's triangle, the surgery was more difficult than where there were only filmy adhesions.[10]

Per-Operative Complications

It is shown that mild bleeding occurred in 7 cases in group A and 20 cases in group B. It was moderate in 17 cases of group A and 5 cases of group B. Bleeding was severe in 1 case in group A. Gall bladder was easily separated from its bed in 19 cases of group A and 16 cases of group B. The separation was difficult in 6 cases of group A and 9 cases of group B. There was no injury to duct in any case during the study. Injury to cystic artery occurred in 1 case in group A.

Bleeding in the operative field occurred in more cases of group A thus obscuring the operative field and making the dissection especially in the region of Calot's triangle difficult. There was less bleeding in group B. Similarly while separating the gall bladder from the bed especially in difficult cases produced more bleeding thus adding the problem in group A cases where already more bleeding was occurring. There was little bleeding in group B even where the separation of gall bladder was difficult because cystic artery was ligated first and so bleeding was less and operative field was clear. Similarly injury to cystic artery which occurred in 1 case of group A created problem in carrying the operative procedure. It was due to laceration of cystic artery by excessive pull when gall bladder was completely separated from the liver. In group B there are less chances of such injury because cystic artery is ligated and secured first and then operation is proceeded. So from the above discussion it was concluded that in fundus first method, more bleeding occurs and makes the operation difficult whereas in duct first (retrograde) method, mild bleeding is there and it is easy to proceed with the operative procedure. Further

analysis showed that gall bladder got ruptured in 4 cases in group A as compared to one case in group B. It can be concluded that chances of rupturing the gall bladder are more while doing cholecystectomy by fundus first method.[11]

Time Taken During Surgery

From table 5 it was clear that in 10 (40%) cases in group A and 16 (64%) cases in group B, the operation could be finished within 50 minutes. In 15 (60%) cases in group A and 9 (36%) cases in group B, it took 51-80 minutes to complete the operation. So it was clear that in retrograde cholecystectomy, time taken to complete the operation was less. More time was taken to perform fundus first method because of more bleeding in these cases. More time was consumed for control of bleeding. From this it was concluded that retrograde method of cholecystectomy can be performed in less time and with more ease as compared to fundus first cholecystectomy. Thus patients under anaesthesia for less time and hence lesser side effects of anaesthesia were there.[12]

Drainage

In table 6, group A in 18 cases out of 22 cases in which drain was put, it was removed on the 3rd postoperative day. It comes out to be 81%. In 4 cases in group A and 1 case in group B ,the drain was kept for 4 to 5 postoperative days. It can be concluded that in most of the cases of retrograde cholecystectomy, drain can be removed earlier because of lesser soakage so retrograde method of cholecystectomy attains higher rank as far as fundus first method is concerned.[13]

Postoperative Complications

Table 7 shows the postoperative complications encountered in both the groups. It was clear from this table that nausea and vomiting occurred in 7 cases in group A and 6 cases in group B. In 2 cases in each group wound got infected. Serous collection occurred in 4 cases of group A and 5 cases of group B. Complications like chest infection, persistence of pain were not seen in any case in both the groups. So on analysis of table 7, it was concluded that there is no significant difference in postoperative complications in both the groups.[14]

Conclusion

Fifty patients suffering from gall bladder stone disease who were admitted to Surgical Units of Guru Nanak Dev Hospital/Govt. Medical College. Amritsar were taken and included in the present study Two groups containing 25 patients each were formed and named as group A and B. In group A cholecystectomy was performed by fundus first method and in group B. cholecystectomy was performed by retrograde method. Various difficulties and complications encountered in peroperative and postoperative period were recorded and the following conclusions were drawn:

1. There was no injury to common bile duct in any case in this study irrespective of method of performing cholecystectomy.
2. Cholecystectomy becomes difficult in fundus first method because of more bleeding which obscures the operative field.
3. There are more chances of rupture of gall bladder while performing fundus first method of cholecystectomy thereby increasing the risk of infection if gall bladder contents are infective.
4. In general, it took longer time to perform fundus first method of cholecystectomy as compared to the retrograde method
5. There was more soakage and for prolonged period from the drain in fundus first method of cholecystectomy
6. Incidence of post-operative complications like nausea and vomiting, wound sepsis and seroma formation was not different in both the groups.

From the study it was concluded that retrograde cholecystectomy should be the first preference. However in difficult cases, it is wise to combine this with fundus first method of cholecystectomy, so as to minimise injury to the structures in the Calot's triangle.

Conflicts of interest: None

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