NECESSARY INCISION IN UPPER ABDOMINAL SURGERY FEASIBILITY AND OUTCOME

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ABSTRACT

Background

Minilaparotomy could offer the patient a less invasive surgical approach when compared to the standard laparotomy; it fulfills the criteria of a minimally invasive surgery involving a very small abdominal incision. The natural progression of minimal invasive surgeries is to perform the same large-scale technical operation with minimal or no evidence of scaring. Between laparotomy and laparoscopy another possible alternative is mini-laparotomy, which serves as an interesting option due to the size and benefit of the small incisions.

Objective

The Aim of our study was to assess the feasibility of performing a major upper abdominal operation through a small incision less than 6 cm in length and recording the outcomes of the procedures.

Methods

This is a prospective study carried out in Sulaymaniyah teaching hospital from October 2010 to October 2012. The study includes thirty-one patients for whom various upper abdominal surgeries were performed. The operations were categorized in to four main groups; (Upper Gastrointestinal, Hepatobiliary, Spleen and combined surgical procedures). Data were collected regarding demographic aspects of each patient. After the procedures the patients were monitored for any local complications related to the incision. Shortly before discharge wound inspection was preformed, information regarding length of incision, duration of hospital stay and wound related complications were recorded.

Results

Of the thirty-one patients, 51.6 % were male and 48.4 % female, the age ranged from 6 months to 85 years, with a mean age of 38.47. The mean incision length was 4.30 cm, ranging from 2 -9 cm, with a mean hospital stay of 42.58 hours (1.77 days). There were no local complications related to the incision noted during the period of observation.

Conclusion

Mini-laparotomy is a feasible approach for upper abdominal surgeries in different age groups as well as different operative procedures.

Keywords: *Necessary Incision, Mini-laparotomy, Small Incision, Upper Abdominal Surgery*

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INTRODUCTION

The first decision a surgeon is faced with in almost all operations is where and how to make their skin incision. There are multiple factors related to patient and operative aims that determine this choice. The primary purpose of any surgical incision is to allow sufficient access to underlying structures thus enabling the procedure to be carried out safely and in a timely fashion [(1)].

The surgeon needs ready and direct access to the organ requiring investigation and treatment, so the incision must provide sufficient room for the procedure to be performed. The incision should (if possible) be capable of easy extension to allow for any enlargement of the scope of the operation, and interferes as little as possible with the strength and function of the abdominal wall [(2)].

All operations are associated with several complications ranging from those related to general anesthesia and those specific to the operation. The main local complications that are closely related and affected by the incision include: pain, bleeding, hematoma, seroma, infection, hernia and unfavorable cosmetic appearance. The larger the incision, the more likely it is that the patient will suffer any number of these potentially avoidable complications [(3-7)].

Minilaparotomy could offer the surgeon a less invasive surgical means of access to the area of interest than the standard laparotomy; it fulfills the criteria of a minimally invasive surgery with a very small aesthetic abdominal incision. Moreover, in a pilot study minilaparotomy was shown to create a neuroendocrine response similar to a laparoscopic procedure but less than a classic laparotomy [(8)].

The natural progression of a minimally invasive surgery is to perform the same larger technical operation with minimal or no evidence of scaring [(9)]. Between laparotomy and laparoscopy another possible alternative is a mini-laparotomy which is an interesting option due to its favorable size of incision [(10)].

Upper abdominal surgical procedures can be conducted by the conventional open method, laparoscopically and /or combined or they can be preformed through a small-incision a bridge between the open and the laparoscopic approach. The advantages of laparoscopic surgeries are obvious and the technique has been extended to pancreatic, splenic and gastric surgery [(11, 12)].

Single incision laparoscopic surgery is a choice in upper abdominal surgery, however the gas-less technique in small incision surgery is easier, safer and avoids potential adverse effects of carbon dioxide pneumoperitoneum on cardiopulmonary function. [(13)]

In the literature most authors used a cut off point of 8 cm (or less) to differentiate between a small-incision and open cholecystectomy [(14)].

Minilaparotomy can be used for the resection of colonic tumors [(15)] and pancreaticodudenectomy using a 7 cm incision in middle upper abdomen used in combination with laparoscopy [(16)] . An incision length of 8-10 cm can be used for gastroplasty, [(17)] and a 4-8 cm incision can be used for gynecological diseases [(18)].

The aim of our study was to assess the feasibility of performing a major upper abdominal operation through a small incision less than 6 cm in length and recording the outcome of this procedure.

PATIENTS AND METHODS

This is a prospective study, which was carried out in Sulaymaniyah teaching hospital from October 2010 to October 2012. The study involved thirty one patients, for whom various upper abdominal surgeries were performed. Patients were categorized to four main groups, upper gastro-intestinal, hepatobiliary, spleen and combined operations according to the patient`s diagnosis, figure 1.

Data were collected regarding demographic aspects from all patients and diagnostic work up done. Verbal and written informed consent were obtained from each patient or legal guardian in case of children following which all patients were consecutively prepared for their proposed procedures.

Postoperatively patients were monitored for any complications. Early oral intake and mobilization were encouraged. Patients were discharged from the hospital as soon as their conditions allowed. Local wound complications and those related to their incisions were recorded. Shortly before discharge wound dressing was inspected in each patient and data were collected regarding length of incision (measured in centimeters) and duration of hospital stay (measured in hours) in the various types of surgery.

Patients were followed up for days, one week, two weeks and 3 months respectively following their procedures. Clinical examinations were carried out on each visit in the outpatient clinic.

Patients were encouraged to resume work and normal daily activity as soon as they felt capable to do so.

Biostatistic methods were used in data analysis, using software IBM SPSS statistics version 21, student t-test was used for obtaining the P value. A P value <0.5 was considered statistically significant.

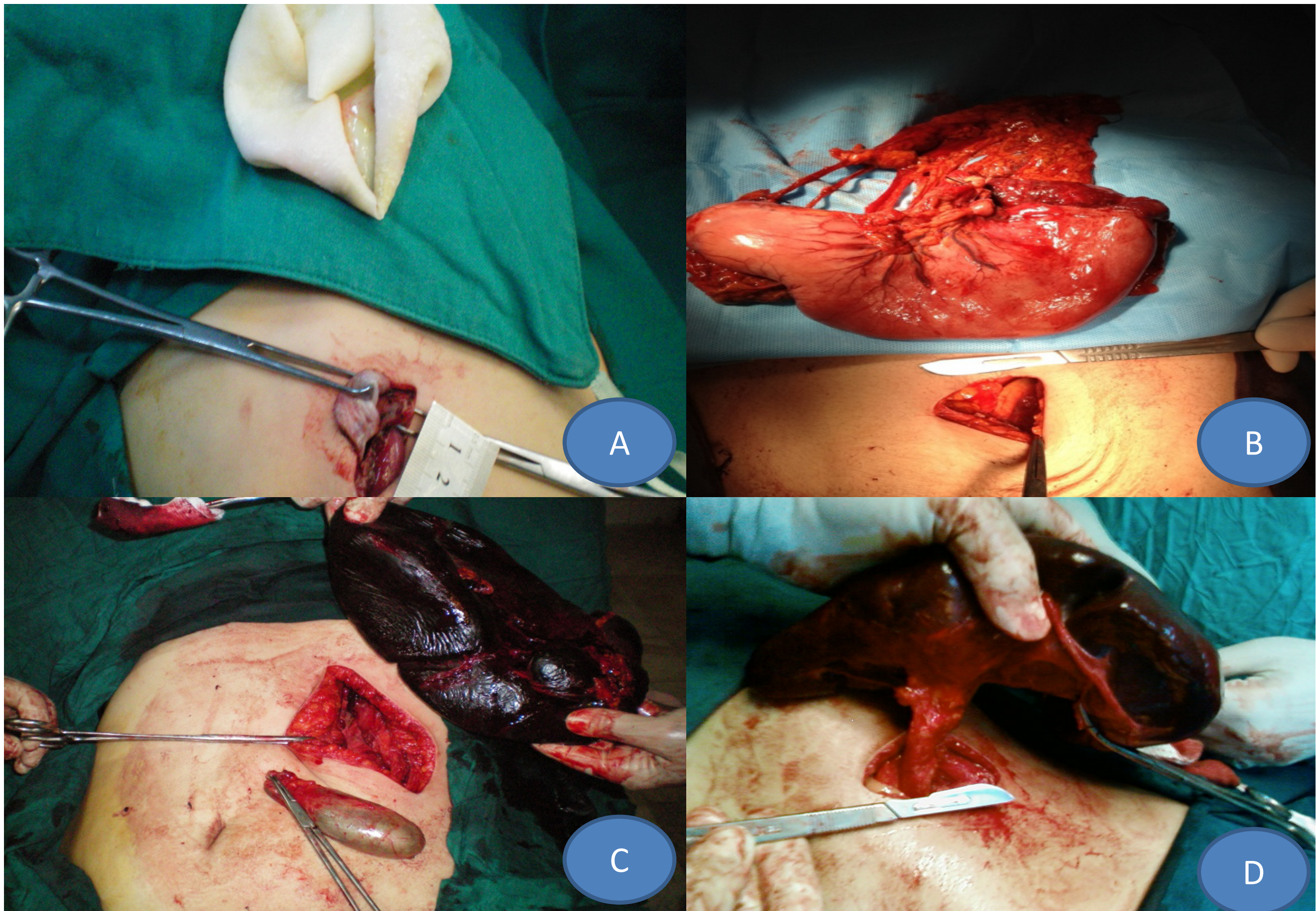

Figure 1. Shows the pictures in each group of surgery A= Hepatobiliary, B= Upper Gastrointestinal Surgery, C= Combined Spleen and Hepatobiliary Surgery and D= Splenic Surgery

RESULTS

From October 2010 to October 2012 thirty-one patients were operated upon using small-incisions for upper abdominal procedures. The demographic data of these patients are shown in table 1.

The surgical procedures were categorized into four main groups as shown in table 2.

There were 15 male (48.4%) and 16 females (51.6%), with Male: Female ratio of 1:1.07. Table 3 shows percentages of gender in each category of surgery.

The age ranged from 6 months to 85 years with mean age of 38.47 years,

The most common condition in our study was spherocytosis and carcinoma of stomach each of which were 22.6%. Table 4 shows frequency and percentages of each condition.

Splenectomy was the most common procedure performed with a percentage of 41.9%, as shown in table 5.

The incision length ranged from (2-9 cm), with mean length of 4.30 cm, as shows in table 6.

The mean duration of hospital stay after the operative procedures was 42.58 hours (1.77 days).

Table 7 shows the statistical analysis and correlation between age, hospital stay and length of incision

Length of incision increase with age, in other words the younger the patient the smaller the incision.

Short-term complications related to incision were not encountered and all patients experienced smooth postoperative periods and normal wound healing.

Table 1. Patient's demographic data showing gender, age and type of surgery.

Types of surgery	Upper GI	Spleen	Hepatobiliary	Combined Spleen and Hepatobiliary	Total
Male	9	3	1	2	15
Female	2	10	4	0	16
Age (years)	0.5 - 80	10-60	12-85	25-30	0.5-85

Table 2. Shows percentages of cases in each category of surgery.

Surgical categories	Percentages
Spleen	41.94
Upper GIT	35.48
Hepatobiliary	16.13
Spleen and hepatobiliary	6.45

Table 3. Shows percentage of gender in each category of surgery.

			Surgery				
			Hepatobiliary	Spleen	Spleen, Hepatobiliary	Upper GI	Total
Gender	Female	% Within gender	25.0%	62.5%		12.5%	100.0%
		% Within surgery	80.0%	76.9%		18.2%	51.6%
	Male	% Within gender	6.7%	20.0%	13.3%	60.0%	100.0%
		% Within Surgery	20.0%	23.1%	100.0%	81.8%	48.4%
Total		% Within gender	16.1%	41.9%	6.5%	35.5%	100.0%
		% Within Surgery	100.0%	100.0%	100.0%	100.0%	100.0%

Table 4.Shows frequency and percentage of each type of conditions.

Conditions	Frequency	Percentage (%)
Spherocytosis	7	22.6
CA Stomach	7	22.6
Hydatid cyst of the liver	4	12.9
Achalasia	2	6.5
Idiopathic thrombocytopenic purpura	2	6.5
Duodenal Stenosis	1	3.2
Hydatid Cysts Of Spleen	1	3.2
Multiple Splenic Cysts	1	3.2
Repeated infection of the spleen	1	3.2
CA head of pancreas	1	3.2
Myelofibrosis	1	3.2
Sever Duodenal Stenosis	1	3.2
Splenic Cyst	1	3.2
Thalassemia	1	3.2
Total	31	100.0

Table 5. Shows percentage of each type of surgical procedures.

Types of surgical operation (procedure)	Number of patient	Percentage (%)
Splenectomy	13	41.9
Gastrecromy with Roux en Y gastrojujenostomy	6	19.4
Excision of Hydatid Cyst	4	12.9
Gastrojujenostomy	3	9.7
Heller's myotomy	2	6.45
Splenectomy and Cholecystectomy	2	6.45
Cholecystojujenostomy	1	3.2
Total	31	100

Table 6. Shows the length of incision in each type of Surgery.

Type of Surgery	Number of Cases	Length of incision in centimeters		
		Mean	Minimum	Maximum
Spleen	13	4.9231	4.00	7.00
Upper GI	11	3.5455	3.00	4.00
Hepatobiliary	5	2.7000	2.00	3.50
Combined	2	8.500	8.00	9.00
Total	31	4.3065	2.00	9.00

Table 7. Shows correlation between Age, Hospital stay and length of hospital stay.

		Mean	N	Std. Deviation	Std. Error Mean	Correlation	P value
Pair 1	Age	38.4677	31	24.92487	4.47664	-0.375	0.037
	Length of incision	4.3065	31	1.56353	0.28082		
Pair 2	Hospital stay hours	42.5806	31	9.44025	1.69552	-0.031	0.871
	Length of incision	4.3065	31	1.56353	.28082		
Pair 3	Age	38.4677	31	24.92487	4.47664	0.381	0.034
	Hospital stay hours	42.5806	31	9.44025	1.69552		

P. value of less than 0.05 is statistically significant.

DISCUSSION

Our study results indicated that mini-laparotomy could be used for all age groups; no age was exempt when considering the size of incision. There was also no difference regarding gender distribution, as the male to female ratio was nearly equal in our study group.

Splenectomy is widely performed for a variety of hematological diseases in which the spleen is culprit, exerting a destructive effect on the blood cells, thereby causing thrombocytopenia, anemia, leucopenia or a combination of these effects (Hypersplenism) [19, 20]. In our study spherocytosis referral by a hematologist was by far the main hematological indication for splenectomy. In contrast a study conducted in Oman by Norman Oneil Mochado, et al. series [21] between 1993-2005 revealed that spherocytosis and idiopathic thrombocytopenic purpura were determined to be the cause of a required splenectomy in only 4%, 8% of 150 patients respectively and other indications of splenectomy were more prevalent.

Our study results coincide with western countries in which the number of splenectomies preformed for patients with spherocytosis and idiopathic thrombocytopenic purpura are greater compared to other hematological diseases. This is due to the prevalence of these diseases in these specific areas [22, 23].

Our results were similar to a study conducted in Iran in which 15.1% of conditions requiring splenectomy were spherocytosis, [24] in contrast to another study conducted in the Middle East, which documented 26% of splenectomies preformed due to idiopathic thrombocytopenic purpura [25].

Gastric cancer is one of the most common causes of cancer- related death in the world; both early and advanced gastric cancer can be treated successfully with surgical resection.[26] Gastrectomy is one of the most common major surgical procedures in gastrointestinal surgery, [27]. It is the most effective treatment for variety of gastric pathologies, both benign and malignant. [28] Roughly a quarter of our operations (22.6 %) were conducted for different stages of carcinoma of stomach.

The mean incision length in our study was 4.30 cm while in Frederik Keus et al. [14] series the mean incision length was 7.6 cm for gallbladder diseases; this incision size is nearly double in length compared to our procedure.

The length of incision in our study is shorter by about a third compared to the mean incision length for minicholecystectomies preformed in Baghdad, which were 6.4 cm (ranging from 5-8 cm) [29] . This was also the case when compared to the mean incision length of a study conduced by Alessandro Fichera et al. showing a 6 cm in series incision for colectomy [3].

Minilaparotomy in lower abdominal conditions and for benign gynecological conditions with Danel Surico et al used a 4-7 cm incision length with a mean incision length of 5 cm [18].

Takeshi Omori et al. [30] perform distal gastrectomies through a 2.5 cm incision laparoscopically. This is smaller than the mean incision length in our study for upper gastrointestinal procedures.

Reduction in the length of hospital stay is an important parameter for the evaluation of quality of surgical treatment. It may be concluded that the shorter hospitalization periods are a direct consequence of the methods used in surgical approach, for example, the choice of small abdominal incision, which produces mild trauma on soft tissue [13] in comparison to a large scale operation.

In our study the mean duration of hospital stay after operations were 42.58 hours (1.77 days). In a series by Daniela Surico et al. [18] the length of hospital stay was 1.84-2.55 days for benign gynecological diseases and this coincides with our findings. Similarly in F. Fanfani et al. series [8], the mean hospital stay was 2.2 days. A series in Baghdad showed the mean postoperative stay in the hospital was longer (2.4 and 3.5 days) for laparoscopic cholecystectomy and minicholecystectomy respectively [29]. A longer hospitalization period was noted in a series by On Suzuki et al. [16] for pancreaticodoudenal diseases, which was 23 days (ranging from 11-36days). In a series by Flower john L. et al. [31] splenectomy was associated with longer hospital stay and post operative complication in which 43 patients were splenectomized by open and laparoscopic methods. Postoperative hospital stay was 2.7, 6.8 days for laparoscopic and open splenectomy respectively, with morbidity and mortality of 11.6% for open splenectomy versus 4.7% in laparoscopic splenectomy.

As in any surgical operation, patients should be selected carefully based on their body builds, associated medical conditions and past surgical history. Our study verifies that in the hand of experienced surgeons, these procedures can be a valuable surgical option for various upper abdominal surgeries. The key success of these procedures is a low threshold to enlarge the incision for the sake of patient`s benefit.

This study found that the use of a small incision in performing upper abdominal surgical procedures have acceptable results in the various aspects, such as reduction in intraoperative and postoperative complications, postoperative discomfort, incision length, and duration of postoperative hospitalization.

In combined cases (6.5%) in which splenectomy and cholecystectomy were done, the incision length increased by about 2-3 cm more than what it was planned. However, they still fell within the acceptable range of minimal access surgery.

In conclusion, Minilaparotomy is feasible in upper abdominal surgeries in different age groups as well as for different operative procedures. The smaller the incision is, the less scaring and hospital stays. These are beneficial both for the patient`s health and for hospital administration.

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