RESULTS

This study was performed on three hundred and twenty five patients addmited in the department of surgery, Benha University Hospital during the period from May, 1993 to December 1994. They were categorized into 4 categories according to the indication for surgery.

Group I (Cholecystectomy group) :

Laparoscopic cholecystectomy was successful in 121 (96.8%) of the 125 in whom it was attempted, for an overall conversion of 3.2%. Elective cases were successful in 113 of 116 patients, for a conversion rate of 2.6%, whereas conversion to open cholecystectomy was required in one of 9 (11.1%) presenting with acute cholecystitis. Table (8) summarizes the reasons for conversion to open cholecystectomy.

Table (8) : Conversion data.

Cause	number	%
Dense adhesions (difficult dissection)	2	1.6 %
Empyema (unable to grasp)	1	0.8 %
Dilated cystic duct with stone inside	1	0 .8 %
Total number of converted cases	4	3.2%

Operative time :

This was calculated from time of skin incision to skin closure. The mean (± SD) operative time for laparoscopic cholecystectomy was 49.3 (±18.8) minutes ranging from 25 - 90 minutes and for open cholecystectomy was 46.7 (± 17) minutes ranging from 35 - 125 minutes ($P > 0.05$, t test).

Complication :

Complication of both laparoscopic cholecystectomy and open cholecystectomy are shown in table (9). Overall complications developed in 7 (5.8%) of the laparoscopic group and 8 (16%) of the open group.

Table (9) : Complications of cholecystectomy.

Complication	Laparoscopic cholecystectomy (n = 121)	Open cholecystectomy (n = 50)
Bile leakage	2 (1.6%)	1 (2%)
Wound infection*	1 (0.8%)	3 (6%)
ileus	2 (1.6%)	2 (4%)
Deep venous thrombosis	--	1 (2%)
Atelectasis	--	1 (2%)
Surgical emphysema	2 (1.6%)	--
Total number of patients with complications**	7 (5.8%)	8 (16%)

* $P < 0.01$ (Z test)

** $P < 0.05$ (χ^2 test).

Analysis of the results in table (9) showed a significant reduction in the incidence of complication in the laparoscopic group than the open group (5.8% vs. 16%, $P < 0.05$).

Post operative use of pain medications :

As shown in table (10), of the laparoscopic cholecystectomy patients; 15 patients (12.4%) required narcotic analgesic and 39 patients (32.2%) took only simple analgesia after being discharged from the

recovery room. On the other hand, 41 patients (82%) of the open cholecystectomy group took narcotic analgesic and only 9 patients (18%) took only simple analgesia.

Table (10) : Postoperative use of pain medications

Analgesia	Laparoscopic cholecystectomy (n = 121)	open cholecystectomy (n = 50)
Narcotic	15 (12.4%)	41 (82%)
Simple	39 (32.2%)	9 (18%)
None	67 (55.4%)	- (0%)

$P < 0.01$ (χ^2 test)

Analysis of the results in table (10), showed that there was a significant reduction in the consumption of analgesia following laparoscopic cholecystectomy ($p < 0.01$).

Post operative hospital stay :

Details concerning the time of discharge are listed in table (11). The mean (± SD) postoperative stay was 1.1 (± 0.3) days for L.C. and 7.9 (± 1.5) days for open cholecystectomy.

Table (11): Discharge data.		
Time	Laparoscopic cholecystectomy (n = 121)	Open cholecystectomy (n = 50).
Same day	27	--
POD -1	85	--
2	5	--
3	3	--
4	1	--
5	--	3
6	--	5
7	--	4
8	--	28
9	--	5
10	--	2
11	--	-
12	--	3
mean (± SD)	1.1 (± 0.3) day	7.9 (± 1.5) days.

$P < 0.01$ (χ^2 test)

POD = postoperative day.

Analysis of the results in table (11) showed that, patients who underwent successful laparoscopic cholecystectomy had a significantly shorter postoperative stay than those of the open cholecystectomy (1.1 ± 0.3 vs 7.9 ± 1.5 day, $p < 0.01$).

Return to normal activity :

Data regarding the time of return to normal activity are summarized in table (12). The mean time (± SD) for return to normal activity after laparoscopic cholecystectomy was 7.6 (±1.7) days and 22.4 (±4.5) days after open cholecystectomy.

Table (12) : Time of return to normal activity

Laparoscopic cholecystectomy (n = 121)		Open cholecystectomy (n = 50)	
Day	No.	Day	No.
5-	11	14-	9
7-	89	21 -	34
9-	12	28 - 35	7
11-	5		
13-15	4		
mean (± SD)	7.6 (± 1.7) days	mean (± SD)	22.4 (± 4.5) days

$P < 0.01$ (χ^2 test)

Analysis of the results in table (12), showed that there was a significant difference between laparoscopic and open cholecystectomy as regard the time of return to normal activity (7.6 ± 1.7 vs 22.4 ± 4.5 days, $P < 0.01$).

Group II (Inguinal hernia repair) :

Twenty seven hernias in 25 patients were successfully repaired laparoscopically.

Operative time :

The mean (± SD) operative time for laparoscopic repair was 43.7 (± 16.1) minutes, ranging from 30 - 95 minutes and for open repair was 41.2 (± 19.2) minutes ranging from 25 - 105 minutes ($p > 0.05$, t test).

Complications :

Complications of both laparoscopic and open repairs are shown in table (13). Overall complications occured in 2 (8%) of the laparoscopic group and 4 (16%) of the open group ($P > 0.05$).

Table (13) : Complications of hernia repair.

Complication	Laparoscopic repair (n = 25)	Open repair (n = 25).
Infection - wound	--	2* (8%)
- mesh	--	1* (4%)
Urine retention	1 (4%)	--
Seroma	1 (4%)	--
Scrotal haematoma	--	1 (4%)
Nerve entrapment	--	1 (4%)
Total number of patients with complications	2 (8%)	4 (16)

* One patient had both complications.

$P > 0.05$ (χ^2 test)

Although not statistically significant, the general trend reflected lesser incidence of complications in the laparoscopic group of patients.

Postoperative use of pain medication :

As shown in table (14); of the laparoscopic group, only 2 patients (8%) required narcotic analgesia and 11 patients (44%) took only simple non narcotic analgesic after being discharged from the recovery room. On the other hand, of the open group of patients; 13 patients (52%) required narcotic analgesic and only 12 patients (48%) took only simple analgesics after being discharged from the recovery room.

Table (14) : Postoperative use of pain medication

Analgesia	Laparoscopic repair (n = 25)	Open repair (n = 25)
Narcotic	2 (8%)	13 (52%)
Simple	11 (44%)	12 (48 %)
None	12 (48 %)	-- (0 %)

$P < 0.01$ (χ^2 test)

Analysis of the results in table (14), showed that patients who underwent laparoscopic repair had a significantly lower consumption of pain medications when compared with those of the open repair ($P < 0.01$).

Postoperative hospital stay :

Details concerning the time of discharge are listed in table (15). The mean (± SD) postoperative stay was 1.1 (± 0.4) days for laparoscopic repair and 3.4 (± 1.1) days for open repair.

Table (15): Discharge data.

Time		Laparoscopic repair (n = 25)	Open repair n = 25
Same day		21	--
POD	1	2	--
	2	1	4
	3	1	12
	4	--	6
	5	--	1
	6	--	2
mean (± SD)		1.1 (± 0.4) days	3.4 (± 1.1) days

$P < 0.01$ (χ^2 test)

POD = postoperative day

Analysis of the results in table (15) showed that, patients who underwent laparoscopic hernia repair had a significantly shorter postoperative stay than those of the open repair (1.1 ± 0.4 vs 3.4 ± 1.1 days, $P < 0.01$).

Return to normal activity :

Data regarding the time of return to normal activity are shown in table (16). The mean (± SD) time of return to normal activity after laparoscopic repair was 6.2 (± 1.6) days and 19.3 (± 6.2) days after open repair.

Table (16) : Time of return to normal activity.

Laparoscopic repair (n = 25)		Open repair (n = 25)	
Day	No.	Day	No.
3-	3	7-	2
5-	13	14-	13
7-	7	21-	7
9-11	2	28 - 35	3
mean (± SD)	6.2 (± 1.6) days	mean (± SD)	19.3 (± 6.2) days

$P < 0.01$ (χ^2 test).

Analysis of the results in table (16) showed that, there was a statistical difference between the laparoscopic and open group of patients as regard the time of return to normal activity (6.2± 1.6 vs 19.3 ± 6.2 days, $P < 0.01$).

Group III (Varicocelectomy group).

The testicular vein (s) was successfully clipped in all 25 patients who could undergo laparoscopy.

The testicular artery was positively identified and preserved in all patients of the laparoscopic group. On the other hand, the artery could not be identified in 4 patients of the open group.

Operative time :

The mean (± SD) operative time for laparoscopic varicocelectomy was 34.1 (± 11.5) minutes, ranging from 20 - 65 minutes and 29.7 (± 12.7) minutes for open varicocelectomy ($P > 0.05$, t test).

Complications :

Overall complications occured in one (4%) of the patients in the laparoscopic group and 5 (20%) of the open group (table 17).

Table (17): Complications of varicocelectomy.

Complication	Laparoscopic varicocelectomy (n = 25)	Open varicocelectomy (n = 25)
Hydrocele	--	3 (12%)
Persistence or recurrence	--	2 (8 %)
Pneumoscrotum	1 (4%)	--
Total number of patients with complications	1 (4%)	5 (20%)

$P < 0.05$ (χ^2 test)

Analysis of the results in table (17) showed a significant decrease in the incidence of complications in the laparoscopic group than the open group (4% vs 20%, $P < 0.05$).

Postoperative use of pain medications :

As shown in table (18), none of the laparoscopic group of patients required narcotic analgesics and only 11 patients (44%) took only simple non narcotic analgesic after being discharged from the recovery room. On the other hand, 7 patients (28%) of the open group of patients required narcotic analgesic and 18 patients (72%) took only simple analgesics after being discharged from the recovery room.

Table (18) : Postoperative use of pain medications

Analgesia	Laparoscopic varicocelectomy (n = 25)	Open varicocelectomy (n = 25)
Narcotic	--	7 (28 %)
Simple	11 (44%)	18 (72 %)
None	14 (56 %)	--

$P < 0.01$ (χ^2 test)

Analysis of the results in table (18) showed that there is a statistically significant difference between laparoscopic and open varicocelectomy as regard the use of pain medications ($P < 0.01$).

Postoperative hospital stay :

Details concerning the time of discharge are given in table (19). The mean (± SD) postoperative stay was 1 (± 0.2) days for laparoscopic varicocelectomy and 2.1 (± 0.7) days for open varicocelectomy.

Table (19) : Discharge data		
Time	Laparoscopic varicocelectomy (n = 25)	Open varicocelectomy (n = 25)
Same day	21	-
POD 1	3	5
2	1	13
3	-	7
Mean (± SD)	1 (± 0.2) day	2.1 (± 0.7) days.

$P < 0.01$ (χ^2 test)

POD = Postoperative day

Analysis of the results in table (19) showed that, patients who underwent laparoscopic varicocelectomy has a significantly shorter postoperative stay than those who underwent open varicocelectomy (1 ± 0.2 vs. 2.1 ± 0.7, $P < 0.01$).

Return to normal activity :

Data regarding the time of return to normal activity are summarized in table (20). The mean (± SD) time of return to normal activity after laparoscopic varicocelectomy was 5.1 (± 1.3) days and 10.5 (± 2.9) days for open varicocelectomy.

Table (20) : Time of return to normal activity.		
Day	Laparoscopic varicocelectomy (n = 25)	Open varicocelectomy (n = 25)
3-	8	--
5-	15	2
7-	2	5
9-	--	7
11-	--	2
13 -15	--	9
Mean (± SD)	5.1 (± 1.3) days	10.5 (± 2.9) days

$P < 0.01$ (χ^2 test)

Analysis of the results in table (20) showed that, there was a statistical difference between laparoscopic and open varicocelectomy (5.1 ± 1.3 vs. 10.5 ± 2.9 days, $P < 0.01$).

Group IV (Appendectomy group):

Laparoscopic appendectomy was successful in 19 patients of the 20 patients with established laparoscopic diagnosis of appendicitis, for an overall conversion of 5%.

As shown in table (21), the proportion of normal appendices was comparable in both groups (20% and 24%, $P > 0.05$). A defenitive diagnosis was made in four of five patients in the laparoscopic group and two of six patients in the open group (80% vs 33.3%, $P < 0.05$, t test).

Table (21) : Operative findings.

	Laparoscopic appendectomy (n = 25)	Open appendectomy (n = 25)
- Normal appendix		
• Adenitis	1	1
• Salpingitis	1	--
• Torsion ovarian cyst	1	--
• Undisturbed tubal pregnancy	1	1
• None *	1 (4 %)	4 (16 %)
• Total **	5 (20%)	6 (24 %)
- Inflammed appendix ***	20 (80%)	19 (76%)

* $P < 0.05$ (Z test)

** $P > 0.05$ (Z test)

*** $P > 0.05$ (Z test)

Operative time :

The mean (± SD) operative time for laparoscopic appendectomy was 36.7 (± 10.5) minutes ranging from 20 - 65 minutes and for open appendectomy was 34.5 (± 17) minutes ranging from 15 - 80 minutes ($P > 0.05$, t test).

Complications :

Complications of both laparoscopic and open appendectomies are shown in table (22). Overall complications occured in one of the laparoscopic group (5.3%) and 4 of the open group (16%).

Table (22) Complications of appendectomy.

Complication	Laparoscopic appendectomy (n = 19)	Open appendectomy (n = 25)
- Wound infection	--	3* (12%)
- Abdominal collection	--	1* (4%)
- Wound haematoma	1 (5.3 %)	--
- Total number of complications **	1 (5.3%)	4 (16 %)

* One patient had both symptoms.

** $P < 0.05$ (χ^2 test).

Analysis of the results in table (22) showed that, there is a significant reduction in the incidence of complications in the laparoscopic group than the open group (5.3% vs 16%, $P < 0.05$).

Postoperative use of pain medications :

As shown in table (23), of the laparoscopically handled patients, one patient only required narcotic analgesic after being discharged from the recovery room and 5 patients a took only simple analgesic. On the other hand, 11 patients of the open group required narçotic analgesia and 14 patients took only simple analgesia after being discharged from the recovery room.

Table (23) : Postoperative use of pain medications

Analgesia	Laparoscopic appendectomy (n = 19)	Open appendectomy (n = 25)
Narcotic	1 (5.3%)	11 (44%)
Simple	5 (26.3%)	14 (56%)
None	13 (68.4%)	--

$P < 0.01$ (χ^2 test)

Analysis of the results in table (23), showed that, there was a statistical difference between the laparoscopic and the open group of patients ($P < 0.01$).

Postoperative hospital stay :

Details concerning the time of discharge are listed in table (24).The mean (± SD) postoperative stay was 1.5 (± 1.4) days for laparoscopic appendectomy and 3 (± 2.8) days for open appendectomy.

Table (24): Discharge Data.		
Time	Laparoscopic appendectomy (n = 19)	Open appendectomy (n = 25)
Same day	4	-
POD 1	12	6
2	2	11
3	1	4
7	-	2
10	-	1
12	-	1
Mean (± SD)	1.5 (± 1.4 days)	3 (± 2.8) days.

$P < 0.05$ (χ^2 test).

POD = Postoperative day.

Analysis of the results in table (24), showed a significantly shorter hospital stay for the laparoscopic appendectomy patients (1.5 ± 1.4 vs 3 ± 2.8 days, $P < 0.05$).

Return to normal activity :

Data regarding the time of return to normal activity are summarized in table (25). The mean (± SD) of return to normal activity was 5.7 (± 1.4) days after laparoscopic appendectomy and 11.8 (± 3.3) days after open appendectomy.

Table (25): Time of return to normal activity.		
Day	Laparoscopic appendectomy (n = 19)	Open appendectomy (n = 25)
3-	3	-
5-	13	-
7-	2	5
9-	1	3
11-	--	9
13-	--	4
15-	--	2
17-	--	-
19-21	--	2
mean (± SD)	5.7 (± 1.4) days	11.8 (± 3.3) days.

$P < 0.01$ (χ^2 test)

Analysis of the results in table (25) showed that, laparoscopic appendectomy patients returned to normal activity significantly faster than after open appendectomy (5.7 ± 1.4 vs 11.8 ± 3.3 days, $P < 0.01$).