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PROPHYLACTIC APPENDICECTOMY DURING ELECTIVE CHOLECYSTECTOMY: EFFECTS ON MORBIDITY; FREQUENCY OF PATHOLOGIC ABNORMALITIES.

By

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In this prospective controlled study, prophylactic appendicectomy was performed on "45" consenting patients undergoing straightforward elective cholecystectomy (group A). The control group (group B) consisted of "55" patients undergoing elective cholecystectomy alone. All patients received a single I.V. dose of one gm. of Cefazolin Sodium and 500 mg of Metronidazole. The overall wound sepsis rate in group A was 6.7% (in obese 8.7%, and in non obese 4.5%). But in group B, it was 7.3% (in obese 8.8%, and in non-obese 4.8%). No mortality and no residual intraperitoneal sepsis in the study. The mean duration of postoperative hospital stay in group A was 3.35 days, and 3.38 days in group B. The mean operative time was 65 minutes in group A and 58 minutes in group B. Forty percent (18 of 45) of the appendices removed had a significant pathologic changes: Lymphoid hyperpharia (8), Fibrofatty infiltration (4), Acute inflammation (2), Mucocele (2) and Parasitic infestation (2). Appendiceal Fecolith (3) and Kinking (2) were macroscopic pathologic findings. The conclusion of this study is that: prophylactic appendicectomy is "BENEFICIAL" during elective cholecystectomy and can be performed safely provided that it is done with adequate exposure from the same incision of the original procedure, without undue manipulation and the patient is protected with an effective prophylactic antibiotic regimen. Also, routine histopathologic examination of appendicectomy specimens should be emphasized as unsuspected but treatable pathology may be detected.

Key words: *Prophylactic appendicectomy, Incidental appendicectomy, Routine appendicectomy, Postoperative sepsis, Cholecystectomy and Appendicectomy.*

INTRODUCTION

Prophylactic appendicectomy is an acceptable addition to many elective operations [1-2-3-4-7-8].

Donn elly et al [1] found that the rate of incidental appendicectomy was higher among females than males (20 V 7 per 100.000 person years) and the rate of acute emergency admission for appendicectomy was the most common admission status and was more common in males than females (122 V 103 per 100.000 person years) in spite of over all decline in the appendicectomy practice in Western Australia.

Primatesta and Goldacre,[2] in epidemiological study of appendicectomy for acute appendicitis and for other conditions, found that emergency appendicectomy for acute appendicitis, was more common in males than females and declined over time, but no decline for conditions which may mimic acute appendicitis. Prophylactic and incidental appendicectomy was much commoner in females peaked at older age than the first two groups. Thomson[3], found that prophylactic appendicectomy was commonly associated with cholecystectomy.

The rationale is to forestall the later development of acute appendicitis and its attendant complications,

avoiding future diagnostic confusion and reoperation without significantly increasing the operative morbidity of the primary surgical procedure. Numerous reports indicate that routine removal of the appendix can accomplish these goals during various obstetric and gynecologic procedures, herniorrhphy and during potentially contaminated laparotomy.

On the other hand, the openion is divided about the merits of prophylactic appendicectomy during elective gall bladder surgery. Kormon and Kaufman,[4] found that the addition of appendicectomy to cholecystectomy increased the wound sepsis rate, whereas, Lenhardt[5], Bogart and Sebesta[6] did not confirm this. These studies suffer from disadvantage of being retrospective and the occurrance of wound sepsis (especially, if it is late or minor) is often omitted from routine hospital notes. Pollock and Evans [7] in a review based on prospective trails of methods of preventing surgical sepsis, they showed that in the absence of an effective prophylactic antibiotic regimen, the risk of postoperative sepsis increased, while in patients protected with such regimen, no increase in the sepsis rate. El – Sefi [8] et al in a prospective controlled study in which all patients were protected with prophylactic antibiotic regimen, the addition of appendicectomy to elective cholecystectomy did not increase the risk of wound sepsis. Solam et al[9], showed that prophylactic antibiotic regimen minimizes the rate of wound sepsis after appendicectomy.

There are many reports[3-6-8-26-29-30] indicating that there was high incidence (range from 10.7% - 90%) of variable abnormal pathologic findings in the appendices removed and presumed to be normal at the time of surgery. In significant portion of these patients appendicitis would presumably have developed and the patient would have required a separate operative procedure at some later date had the appendix not already been removed.

This prospective controlled study was designed to assess:

- The morbidity (wound sepsis rate, hospital stay, operative time).
- The frequency of variable pathologic abnormalities in the appendices removed.
- Whether these pathologic findings provide additional useful information for management.

PATIENTS AND METHODS

Between March 1999 and June 2001, prophylactic appendicectomy was offered to "100" patients [(71 females, 29 males)] admitted for elective cholecystectomy in Manshieyet El – Bakry Hospital.

Those desiring the appendicectomy were entered the Group A, and those declining or who had no appendix constituted the control group (Group B). A standard form was completed for every patient recording the patient's name, age, sex, body built, full history, clinical examination, abdominal ultrasound, written consent for Group A patients, prophylactic antibiotic regimen, operative details, operative time, post operative follow up, pathology report of the appendix, post operative hospital stay, date and duration of readmission if occurred.

To avoid bias created by variability in the manual skills of different surgeons, all patients were operated upon by the author. The surgical procedure was the same in all cases using right paramedian incision. All patients received single IV. dose of 1 gm Cefazolin Sodium and 500 mg Metronidazole during induction of anesthesia.

The subcutaneous fat was measured at the site of incision by sterile ruler, cholecystectomy was done after proper exploration of the abdomen, and laparotomy pad inserted into the gallbladder bed until the appendicectomy, in consented patient, was completed. If the appendix could not be visualized in its entirety without extensive dissection and without extending the incision, the appendicectomy was abandoned and the case was included in the Group B. Drain was placed in Morison's pouch. The operative time was calculated and the appendix was sent for histopathology. Postoperatively, all patients were observed daily in the hospital, and discharged on the third postoperative day, if the patient is well. All patients were examined 4 days after discharge, then weekly up to 4 weeks. Every patient was instructed to consult the surgeon at any time after discharge from the hospital if there is any problem. Obesity was defined as a thickness of subcutaneous fat at the site of incision of 2.5 cm or more. Sepsis was classified as "major" or "minor" either "early or late". [7-10]

Major sepsis meant intraperitoneal collection or infected wound accompanied by constitutional disturbances delaying the patient's discharge or necessitating readmission.

Minor sepsis meant inconvenience of the daily dressings of the patient. Early sepsis meant infection which occurred during the first week. A wound infection was diagnosed when pus drained from the wound regardless of whether or not an organizm was cultured. Wounds that were indurated, reddened or tender were followed up until these conditions resolved or drainage occurred[7-10].

RESULTS

In this prospective controlled study, 100 patients were underwent straightforward elective cholecystectomy. Of these, 50 patients were entered into the appendicectomy group (Group A), and the remaining "50" constituted the control group (Group B). In 5 patients from group A,

appendicectomy was abandoned because of difficult exposure and they were entered into the Group B. No mortality and no intraperitoneal sepsis occurred in this study. (Tables 1,2) Showing the demographic data of the patients.

Postoperative wound sepsis occurred in three patients in group A (6.7%), two early major wound sepsis (8.7%) in obese patients of this group delaying the discharge of these patients for 10 and 12 days, and one early minor wound sepsis (4.5%) in non obese patients of this group and the patient was observed in out patient clinic. In Group B wound sepsis occurred in four patients (7.3%), two early major wound sepsis (delaying the discharge of the these patients for 9 & 14 days) and one early minor wound sepsis (delaying the discharge of this patient for 7 days) in obese patients (8.8) of this group, and one late major wound sepsis (4.8%) in non obese patients of this group necessitating readmission for 9 days.

(Table 3) showing the distribution of wound sepsis and influence of obesity)

The overall postoperative hospital stay in group A was 3.35 days and in Group B was 3.38 days. The mean operative time in Group A was 65 minutes and in group B was 58 minutes.

Table (1) : ***Distribution of patients regarding age, sex***

Age	*Group A (45)*		*Group B (55)*		*Total*
	Male	Female	Female	Male	
< 30	3	5	9	2	19
30 – 39	5	14	18	4	41
40 – 49	2	9	10	3	24
50 – 59	4	3	6	3	16
Total	14/45	31/45	43/55	12/55	100

Table (2) : ***Distribution of patients regarding obesity***

	Group A (45)			*Group B (55)*		
	Male	*Female*	*Total*	*Male*	*Female*	*Total*
Obese	5	18	23	6	28	34
Non obese	9	13	22	6	15	21
Total	14	31	45	12	43	55

Table (3) : ***Over all wound sepsis rate and effect of obesity***

		Group A (45)			*Group B (55)*		
		Over all	*In abese*	*Non ob*	*Over all*	*Ob*	*Non ob*
Early	Major	2	2	0	2	2	0
	Minor	0	0	0	1	1	0
Late	Major	0	0	0	1	0	1
	Minor	1	0	1	0	0	0
	Total	3/45	2/23	1/22	4/55	3/34	1/21
	%	6.7%	8.7%	4.5	7.3%	8.8%	4.8%

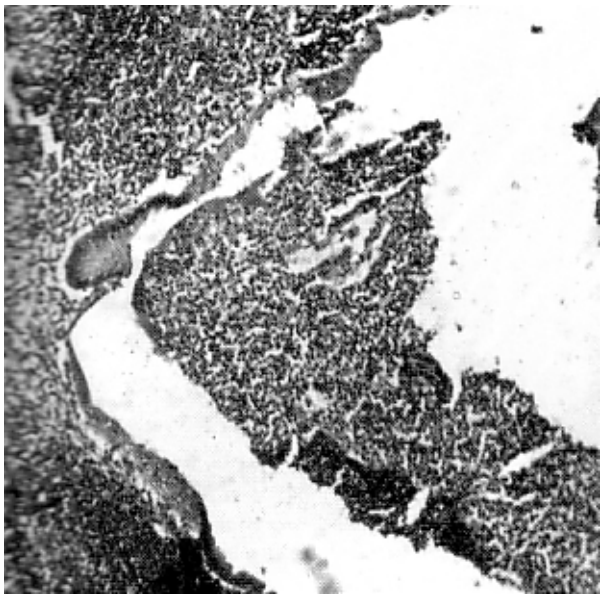

Fig.(1): A ppendiex showing suppurative inflammatory changes with inflammatory exudate in the lumen and acute inflammatory cells infiltrating the wall. (H&E. X 80).

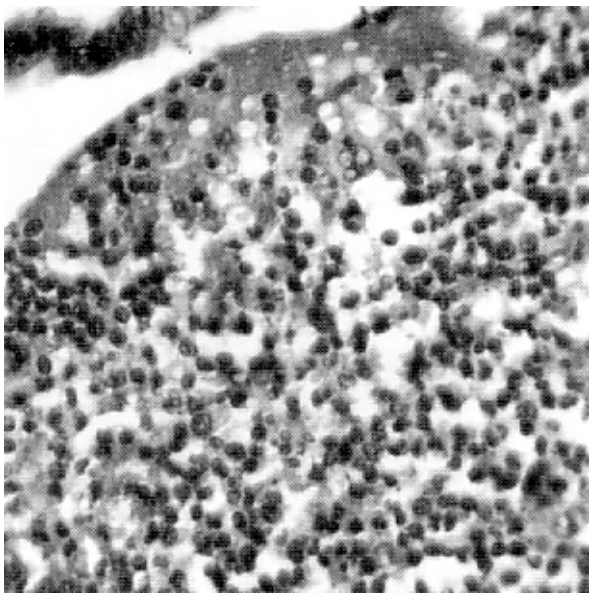

Fig.(2): High power view of the same case showing inflammatory axudate in the lumen composed of neutrophils entangling pus cells and histocytes,(H&E. X 200).

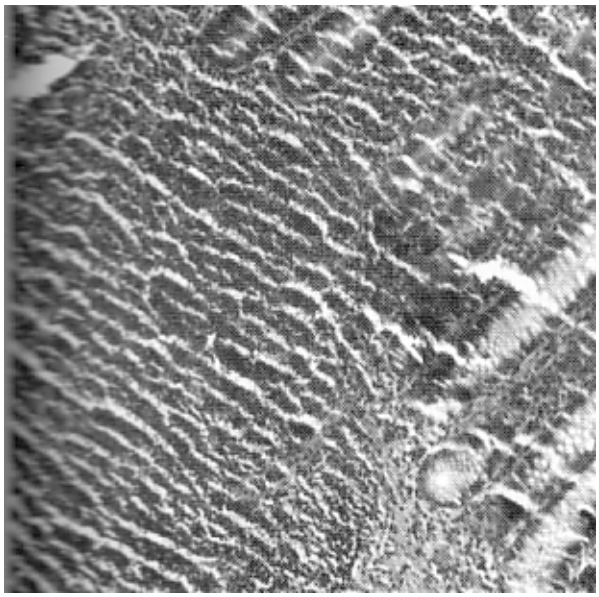

Fig.(3): Appendix showing hyperplasia of the lymphoid Tissue (H&E. X 80).

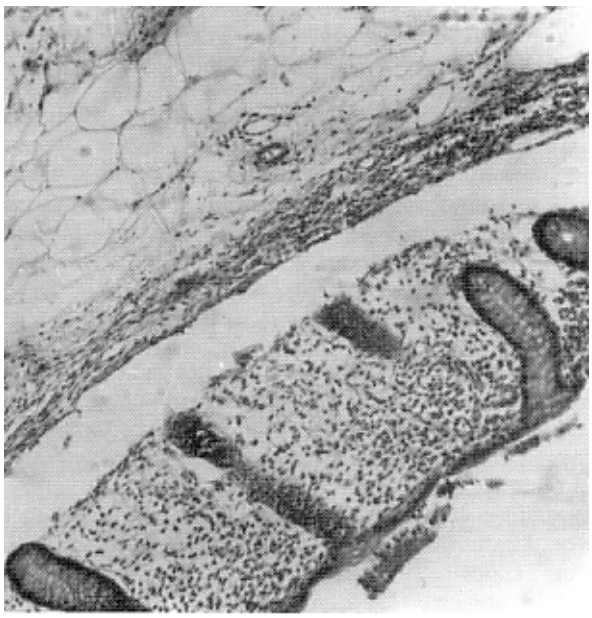

Fig.(4): Appendix showing glandular and lymphoid atrophy and replacement of the submucosa by fatty infiltration (H&E. X 80)

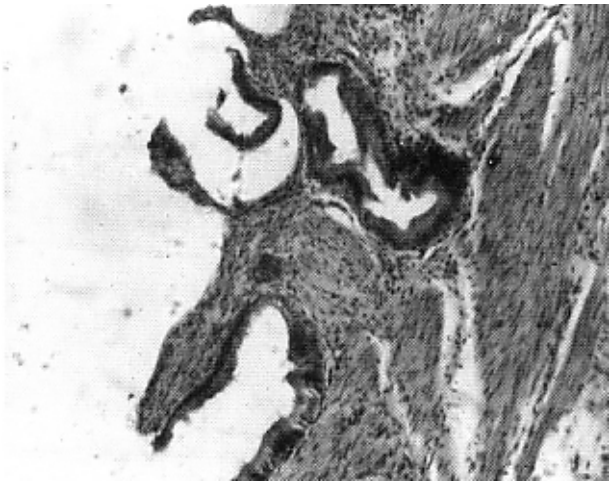

Fig.(5) : Mucocoele of the appendix showing Replacement of the lining epithelium by tall columnar mucus secreting epithelial lining (H&E. X 80).

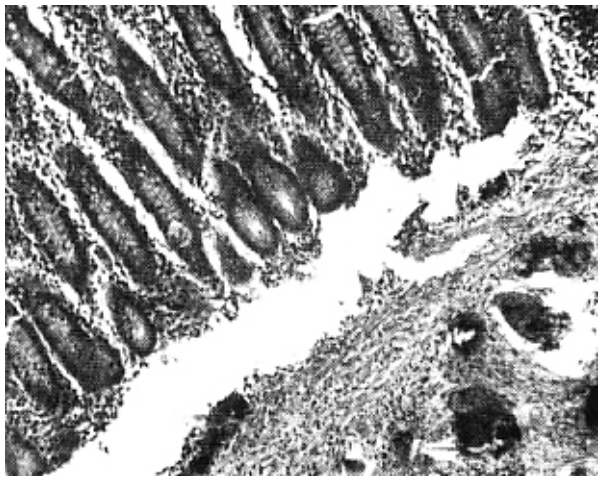

Fig.(6): Appendix showing numerous calcified bilharzial ova in the submucosa. (H & E X 80).

Of the 45 appendicectomy specimens, 18 (40%) had significant pathologic changes as follow: Infiltration of the wall by acute inflammatory cells in 2 cases (4.4%) (Fig. 1&2)

Lymphoid tissue hyperplasia in 8 cases (17.8%) (Fig 3). Fatty infiltration of the wall in 4 cases (8.9%) (Fig 4). Mucocele in 2 cases (4.4%) (Fig 5) parasitic infestation (Bilharzial) in the form of calcified ovum or belharzial granuloma in the wall in 2 cases (4.4%) (Fig 6).

An additional macroscopic pathological findings were the presence of appendical fecolith in 3 cases (6.7%) and kinking in 2 cases (4.4%).

DISCUSSION

Acute appendicitis is the most common acute surgical condition of the abdomen. The true cause of appendicitis is not well understood, so no individual seems immune from the risk of appendicitis.[11] The correct and timely diagnosis of acute appendicitis continues to confound astute clinicians in all specialties[12]. It has been reiterated by many authors that despite the dramatic improvement in mortality rates from appendicitis, serious morbidity still attends this condition[13].

Incidental appendicectomy has been and continues to be a controversial procedure. Current justifications for incidental appendicectomy include: avoidance of later acute appendicitis and its attendant complications, elimination of confusion over future conflicting diagnosis and exclusion of a potential site of future abnormalities, without significantly increasing the operative morbidity of the primary surgical procedure[6-18-24-29]. Also, series of prophylactically removed appendices have produced unexpected findings at reported rates ranging from 10% to 90%.[3-5-6-8-26-29-30] Insignificant portion of these patients appendicitis would presumably have developed and patient would have required a separate operative procedure at some later date had the appendix not already been removed.[14]

Opponents of incidental appendicectomy counter by stating that this meddlesome practice violates sound surgical principles by transecting a fecal containing organ in an otherwise clean operation, as well as potentially increasing blood loss, operating time and morbidity. However, to justify prophylactic appendicectomy, the risk of future appendicitis should exceed the risk of complications resulting from the additional appendicectomy.

Ludbrook and Spears [15] devised a statistical technique for estimating the risk at any age of a New Zealand European developing appendicitis in his remaing life time. For males, the risk at birth is about one in five, and at 50 years of age, is about one in 35. For females, the respective risks are one in six and one in 50. Between the ages of 50 – 70 years the risk falls to less than one chance in 100. Therefore they supported that between these ages, the risk of incidentally removing a normal appendix out weights the probability and the risk of a patient subsequently developing appendicitis. On the other hand, Peltokallio and Tykka [16] discussed the seriousness and high mortality of appendicitis in persons over 60 and stressed that prophylactic appendictomy assumes an even more significant role for elderly.

McVay's retrospective study [17] raised the question of increased rates of colonic cancer in patients with previous appendicectomy. However, in a review of this topic by Silvert and Mears [18] five retrospective studies showed no relation between appendicectomy and subsequent neoplasia and four studies showed a positive causal relation. A single prospective study by Moertel et al [19] showed no increased incidence of neoplasia in patients with previous appendictomy.

Prophylactic appendicetomy has been also objected to on basis that the appendix may have an immune function and serve as a source of immunological competent lymphocytes. There is no evidence that appendicetomy results in any deficit in any lymphocyte mediated function in man.[20]

Numerous authors have evaluated the risk of incidental appendicectomy with elective operations. Eisman et al [21] stated that appendicectomy performed during right inguinal herniorrhaphy in 429 patients increased neither recurrence nor complication rates. Also, Brown et al,[22] Keeley and Schairer [23] and Shumake [24] have reported a similar experience. Myers and Schereier [25] found no greater incidence of postoperative morbidity among 483 obstetrical surgery patients with incidental appendicectomy than among 1201 similar patients without appendicectomy.

This experience has been confirmed in obstetrical and gynecological procedures by several authors[14-28-29].

Whether prophylactic appendicectomy should be performed during elective cholecystectomy is still unsettled issue. Korman and Kaufman[4] reporting 62 cases, found a wound infection rate really three times higher than in non–appendicectomy cholecystectomy patient. Conversely, Lowery and Lenhardt[5] and Bogart and Sebesta[6] reported no increase in complications or postoperative hospitalization whether the patient had undergone incidental appendicectomy or not.

These studies suffer from the disadvantage of being retrospective, and the occurrence of wound sepsis (especially if it is late or minor) is often omitted from routine hospital notes. Pollock and Evans[7], reviewed the incidence of septic complications after cholecystectomy alone and after cholecystectomy plus appendicectomy. Their review was based on a series of prospective clinical trials of methods of preventing surgical sepsis. They showed that, in the absence of effective antibiotic prophylactic regimen, the addition of appendicectomy increases the risk of postoperative sepsis, but in patients protected by cephaloridine, appendicectomy did not increase the risk of such sepsis.

El Sefi et al[8] compared the incidence of postoperative morbidity after elective cholecystectomy alone with that after elective cholecystectomy with prophylactic appendicectomy in a patient population involved in a prospective controlled study on 116 patients in which all patients protected with Cefazolin Sodium and Metronidozale, They showed that the addition of appendicectomy did not increase the risk of post operative morbidity and recommend prophylactic appendicectomy provided the patient is protected with prophylactic antibiotic regimen.

In this prospective controlled study, patients were not allocated to the groups randomly. The decision to take out th appendix depended on the patient's consent and absence of technical difficulties. All patients received a single prophylactic preoperative dose of Cefazolin Sodium and Metronidazole directed towards aerobic and anaerobic organisms, likely to be encountered in the appendicular lumen and the bile. The results obtained showed that the addition of appendicectomy to elective cholecystectomy did not increase either the risk of post operative sepsis or the duration of post operative hospital stay.

These results are in agreement with those reported by Pollock and Evans [7] and El – Sefi et al [8].

Additional support for the prophylactic appendicectomy comes from frequent notation of abnormal pathologic findings in the appendices removed.

Tanigchi and Straton[26]; reviewed histopathologically a series of 247 appendices removed incidental to cholecystectomy. They found that acute inflammation was present in 12.1% and 14.9% contained fecolith Lowery and Lenhardt[5]; found that 28.4% of incidentally removed appendices during cholecystectomy were pathologically abnormal and 6.8% were acutely inflamed. Bogret and Sebesta[6] reported that 37.7% of the incidentally removed appendices with cholecystectomy were pathologically abnormal and 4.3% were acutely inflamed. Kron and Bergauer[27], reported an incidence in excess of 90% abnormal findings in their series of incidental appendicactomy. Melcher [28] reported that out of "45" appendices removed at elective Hysterectomy, 12 (27%) contained intraluminal pus and another 16 (35%) demonstrated increased fibrous tissue. Tow appendices contained carcinoid tumour, one contained mucocele, one contained melanosis coli and one contained doubly refractile material within the appendical lumen.

Also, Walters [29] reported incidence of 55% abnormal histologic findings in his series of 830 appendicectomies performed to a variety of surgical procedures. Miranda et al, [30] in their study of frequency of pathologic abnormalities in117 incidentally removed appendices demonstrated that 32%, had significant pathologic findings; Fibrosis in 23%, Chronic inflammation in 3%, Carcinoid tumour in 1% and other pathologic abnormalities in 4%. El Sefi et al [8] reported

six out of 56 (10.7%) of appendicectomy specimens had pathologic abnormalities, Focal acute appendicitis (one), Lymphoid hyperplasia (two), Chronic appendicitis (one), and Fibrosis (two). Thomas [3] reported unsuspected but treatable parasitic and protozoal infection in 3% of 370 appendicectomy specimens in his study.

Helmy et al[31] also reported unsuspected but treatable parasitic and protozoal infestations in 14.8% of 127 appendicectomy specimens in their study. They concluded that schistosomiasis and enterobiasis were important factors in the pathogenesis of acute and chronic appendicitis in Egypt.

In this prospective study, pathological reports of the appendices removed revealed that 18 out of 45 (40%) had significant pathologic diagnosis. Thus we are in agreement with those reported by other authors. As regard Fibrosis, our findings are in agreement with Miranda et al [30] openion that the presence of fibrosis support the theory that the appendix may undergo bouts of acute inflammation that are self limited and that fibrosis is a direct sequel of such episodes. Lymphoid hyperplasia may produce enough obstruction in the lumen of the appendix to cause appendicitis and even intussusception. Condon[20] stated that approximately 60% of the causes of acute appendicitis due to obstruction are related to lymphoid hyperphasia.

The conclusion of this study is that: prophylactic appendicectomy during elective cholecystectomy is beneficial for the patient, and can be performed safely provided that it is done with adequate exposure, without undue manipulation and the patient is under cover of prophylactic antibiotic regimen. Also, routine histopathologic examination of appendicectomy specimens should be emphasized as unsuspected but treatable pathology may be detected.

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