Original Research Article

Clinicopathological observations on incidental appendicectomy in a tertiary care teaching hospital, Ranchi

Krishna Chander Birua[1], Manju Boipai[2], R G Baxla[3], Shashi Dinkar Minj[4*], Rameswari Beck[5], R N Singh[6]

[1]Assistant Professor, Department of General Surgery, ICARE Institute of Medical Sciences and Research, Banbishnupur, Purba Medinipur, Haldia 721645, West Bengal, India
[2]Assistant Professor, Department of Microbiology, Hazaribagh Medical College, Hazaribagh 825319, Jharkhand, India
[3]Associate Professor, Department of General Surgery, Rajendra Institute of Medical Sciences Bariatu, Ranchi 834009,Jharkhand, India
[4]Associate Professor, Department of Anesthesiology, Hazaribagh Medical College, Hazaribagh 825319, Jharkhand, India
[5]Assistant Professor, Department of Obstetrics & Gynaecology, Hazaribagh Medical College, Hazaribagh 825319, Jharkhand, India
[6]Professor & Head, Department of General Surgery, Rajendra Institute of Medical Sciences Bariatu, Ranchi 834009,Jharkhand, India

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Abstract

Background: Incidental appendectomy is defined as the removal of a clinically normal appendix during non-appendiceal surgery. This study was conducted at RIMS, Ranchi to document effects of incidental appendicectomy on overall morbidity and mortality while performing the intra-abdominal operation and also to study the frequency of pathological findings in incidentally removed appendices and the correlation between the pathology in the appendix with known aetiological factors for acute appendicitis.**Materials & Methods:** The diagnosis of the primary intra-abdominal pathology was made on the basis of a detailed history through clinical examination, supported by laboratory investigations and confirmed during operation besides, the patients. The clinical setting-emergency or elective laparotomy in which the appendix was removed was noted. Laparotomy incision used was noted with regard to the case with which the appendix could be approached. The naked eye examination of the appendix was noted. A piece of appendix was collected for histopathological examination. **Results:** About 42% of patients were below 30 years of age. Approximately 68% of female patients were below 40 years of age. Diseases of the extra-hepatic biliary tree were the most frequent indications for operation in female patients (91%). Contaminated operations formed 88% of abdominal operations. Appendix could be easily approached and removed in 90% of the laparotomies. Operative time (length of anaesthesia) was increased by an average of 7.7 minutes. Retrocaecal position was the commonest site of appendix (68%). Length of appendices varied between 2.5-15 cms, majority being about 5-10 cms in length. Fibrotic changes with luminal obliteration were observed in 15% of appendices. Faecoliths alone or with bands, kings, adhesions or thickening of wall of appendix were present in 12% cases. Evidence of focal or catarrhal appendicitis was evident in 3% cases. Post-operative hospital stay was 12 days or less in the majority of patients (93%). **Conclusion:** An incidental appendicectoy should be performed when operating in abdomen for the surgical treatment of some other diseases, where no contraindication exists. The added procedure does not increase either intra-operative risk or post-operative complications and spares the patient from the possible subsequent development of acute appendicitis.

Keywords: Appendix, appendicitis, abdominal pathologies**,** laparotomy, incidental appendicectomy, histopathology.

**Correspondence*

Dr. Shashi Dinkar Minj

Associate Professor, Department of Anesthesiology, Hazaribagh Medical College, Hazaribagh 825319, Jharkhand, India
E-mail: drsdinkar@gmail.com

Introduction

Appendix may be considered a specialized structure rather than being degenerate and vestigial, on the basis of its histological differentiation and rich blood supply [1]. At present, it is being recognized as one of the sites of maturation and processing of the thymus independent lymphocytes (Gray's Anatomy). Another function attributed to appendix is that it produces immunoglobulins as part of the gut associated with lymphoid tissue [2].

Is it safe, is it wise, or is it feasible to do an incidental appendicectomy when operating in the abdomen for the surgical treatment of another disease? Interestingly enough it is a fairly common practice but whatsoever, whether an incidental appendicectomy should be performed remains a controversial issue, as, there being no unanimity among surgeons regarding routine removal of appendix during intra abdominal operations for different diseases [3]. Because of the apparent ignorance regarding status of appendix, incidental appendicectomy is suggested for the avoidance of future risk of acute appendicitis and its complications while doing laparotomy for treatment of abnormalities of any other organ, if any. With some qualifications, this practice is recommended by the majority of general surgeons and has been advocated in surgical text books.

Incidental removal of appendix has been opposed on the ground that appendix may play a major role in the field of surgical reconstruction, mainly in the field of urology. Selected groups of patients have been suggested where the appendix should be conserved expectantly [4].

At present one of the main arguments against incidental appendicectomy is the added risk of wound infection in a clean abdominal operation, which is one factor associated with an increased postoperative morbidity. But different observers have reported both an increase and no change in wound infection rate after incidental appendicectomy [5].

In an effort to circumvent this problem of wound infection inversion-ligation method of appendicectomy is used by some, which obviates the need to transectthe appendix there by eliminating the changes of contamination of wound by faecal organism [6].

Majority of patients in our set-up who underwent any elective abdominal operation were also subjected to incidental appendicectomy, usually carried out by surgeons in training, at the end of the elective abdominal operation in the present study conducted with not a single case as regards to ill-effects if any of the incidental appendicectomy had been found in patients of this region. This study was conducted at Rajendra Institute of Medical Sciences, Ranchi (RIMS) to document effects of incidental appendicectomy on overall morbidity and mortality while performing the intra-abdominal operation and also to study the frequency of pathological findings in incidentally removed appendices and the correlation between the pathology in the appendix with known aetiological factors for acute appendicitis.

Material and Methods

The clinical material for this study came from 100 consecutive cases of laparotomy carried out on patients admitted in different units of Department of Surgery between 3 years. Institutional ethics committee approval was taken and written informed consent was taken before enrolment of study participants. These cases constituted only those patients in whom appendicectomy was carried out as an incidental procedure, there being another intra-abdominal pathology for which the laparotomy was primarily undertaken. All such cases have been observed closely and followed from the time of admission till their discharge from the hospital.

The diagnosis of the primary intra-abdominal pathology was made on the basis of a detailed history through clinical examination, supported by laboratory investigations and confirmed during operation besides, the patients, wherever applicable were closely questioned regarding features of appendicular dyspepsia in the past or at the time of admission. The clinical setting-emergency or elective laparotomy in which the appendix was removed was noted. Laparotomy incision used was noted with regard to the case with which the appendix could be approached. It was noted whether the appendix could be approached easily or only with difficulty. The naked eye examination of the appendix was noted. A piece of appendix was collected for histopathological examination.In the post-operative period, the patients were followed till their discharge from hospital. Any complications were noted. Complications attributable to removal of appendix and adding to post-operative morbidity and mortality were noted. Every patient's post-operative period of stay in the hospital was recorded.

Results

The present study consists of observations made on 100 patients who underwent laparotomy for various pathological conditions of abdominal organs, in whom vermiform appendix was removed as an incidental procedure.

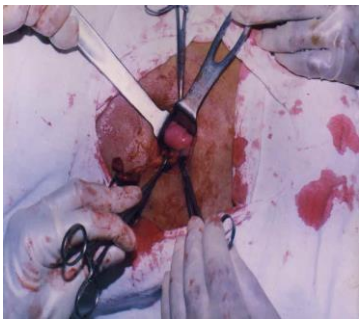

Fig 1: Photograph showing appendicectomy during cholecystectomy

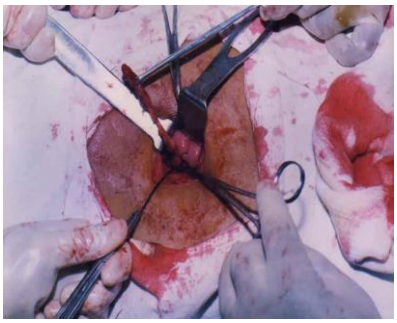

Fig 2: Photograph showing appendicectomy during incisional hernia repair

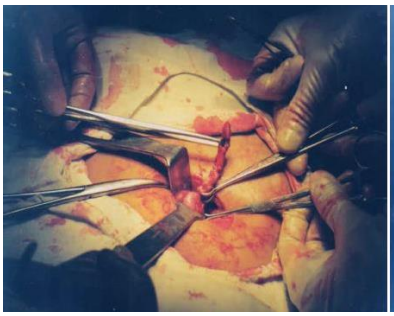

Fig 3: Photograph showing perforated appendix

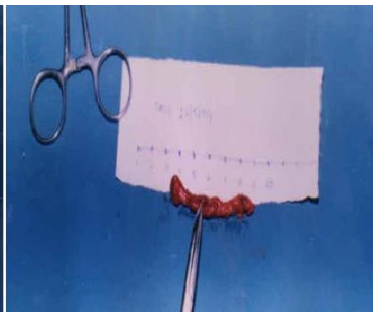

Fig 4: Photograph showing faecolith in the lumen of appendix

Table 1: Age & sex incidence of cases of incidental appendicectomy [N=100]

Age group (In years)	No. of patients	Percentage
0-10	5	5
11-20	1	1
21-30	36	36
31-40	26	26
41-50	22	22
51-60	10	10
≥61	0	0
Male	24	24
Female	76	76
Total	100	100

Majority (36%) of patients in whom incidental appendicitis was perform were in their 3rd decade of life followed by patients in 4th (26%) and 5th (22%) decades of life. Only 10% of patients were over 50 years of age [Table 1]. A total of 76% of patients were females. Majority of the female patients (89.4%) were under 50 years of age. Majority of male patients (91.6%) were under 50 years of age [Table 1].

Table 2: Abdominal pathologies for which laparotomy was under taken [N=100]

Pathology	Male	Female
Chronic calculus cholecystitis	4	55
Acute calculus cholecystitis	0	3
Chronic calculus cholecystitis	0	2

Empyema of gall bladder	0	3
Chronic cholecystitis with choledocholithiasis	1	6
Chronic duodenal ulcer	3	1
Hydronephrosis	2	1
Hydatid cyst of kidney	2	0
Peritoneal adhesions	2	0
Crohn's disease (Stricture of small intestine)	0	1
Hirsch prung's disease	3	0
Mechet's diverticulitis	5	0
Uterine fibromyoma	0	2
Mesenteric cyst	0	1
Ovarian cyst	0	2
Incisional hernia+chronic cholecystitis	0	1

Commonest indication for laparotomy in females was in diseases in the biliary tree which constituted 69% of the total cases. Chronic duodenal ulcer or without gastric outlet obstruction was the commonest indication for surgery in males. Three patients had more than pathological condition necessitating laparotomy. Two of three – one male and one female – had chronic calculus cholecystitis in addition to chronic duodenal ulcer. One female patient had incisional hernia in addition to chronic calculus cholecystitis [Table 2].

Table 3: Incidence of various elective operations performed

Operation Performed	Male [%]	Female [%]	Total [%]
Cholecystectomy	6	62	68
Cholecystectomy and choledocholithotomy	1	6	7
Cholecystectomy + gastrojejunostomy with or without vagotomy	1	1	2
Partial gastrectomy	1	0	1
Vagotomy + gastrojejunostomy	5	0	5
Gastrojejunostomy	4	0	4
Peritoneal adhesionolysis	2	0	2
Jejunojejunal anastomosis	0	1	1
Abdomino and pull through operation	3	0	3
Meckelian diverticulectomy	1	0	1
Hysterectomy (abdominal)	0	2	2
Mesenteric cyst excision	0	1	1
Cholecystectomy + Incisional hernia repair	0	1	1
Oophorectomy	0	2	2
Total	24	76	100

Cholecystectomy alone was the most commonly performed elective operation (64/100) [Fig. 1]. Gastrojejunostomy with without vagotomy was the next most commonly performed operation (12/100). Other operations performed included cholecystectomy and choledochelithotomy nephrectomy, peritoneal adhesionolysis, abdomino-anal pull through operation, jejunojejunal anastomosis, Meckelian diverticulectomy, abdominal hysterectomy, mesenteric cyst excision, repair of incisional hernia [fig. 2] and oophorectomy [Table 3].

Table 4: Different incisions employed for elective abdominal surgery and incidental appendicectomy

Incision	No. of cases	Appendix easily approachable
Right Paramedian	55	50
Right subcostal (Kocher's incisions)	36	32
Midline	09	08
Total	100	90

The commonest incision used was right paramedian incision (55/100) followed by right subcostal incision (36/100). Appendix was easily approachable in 50 out of 55 patients where right paramedian incision was used. It was easily approachable in 32 out of 36 cases with right subcostal incision. Appendix was delivered easily into the operative wound in 8 out of 9 cases with midline incision. Thus a total of 90 patients out of 100 appendixes could be removed easily. In all cases appendicectomy was done by ligating the base of appendix and amputation of the distal portion

[Table 4]. Average time taken for doing appendicectomy was 7.7 mins. The time ranged from 4-13 mins. In this series the commonest position of appendix was retrocaecal (68%) followed by the pelvic position (18%) [Table 5].

Table 5: Showing different positions of appendix [n=100]

Position	No. of cases	Percentage
Retrocaecal	68	68
Pelvic	18	10
Paracaecal	5	5
Subcaecal	8	8
Post ileal	1	1
Pre ileal	0	0
Total	100	100

Table 6: Showing macroscopic feature of appendices

Macroscopic feature	No. of cases
Normal	74
Catarrhal or focal appendicitis	03
Faecaliths	04
Bands, kinks, adhesions thickening	08
Faecaliths and bands/adhesions/thickening	08
Luminal obliteration	10
Parasitic worms	03

About 74% of the total appendices were macroscopically normal. Commonest finding was the presence of faecoliths [fig. 4] with or without bands, kins adhesions, or thickening in the wall of appendix. Catarrhal appendicitis was observed in 3 specimens. Partial or complete luminal obliteration was observed in 10 cases [Table 6].

Table 7: Showing microscopic features of specimens of appendices

Microscopic feature	No. of cases
Catarrhal appendicitis showing polymorphonuclear infiltration of the muscularis mucosae	03
Fibrosis in the wall of appendix with partial or complete obliteration of the lumen	15
Normal	82

Fibrosis was observed microscopically in 15% of the specimens. 13 of these were in appendices from patients whose age ranged from 20-40 years. Catarrhal appendicitis showing polymorphonuclear cell infiltration of the muscularis mucosae was observed in 3 cases [Table 7]. Mean duration of post operative hospital stay of all patients was 11.37 days. Mean duration of post operative hospital stay of patients with complication was 11.46 days. Post operative hospital stay ranged from 8 to 15 days with most of the patients leaving hospital within 12 days (93%). Stonal obstruction (Transient) (after gastrojejunostomy) was observed in 2 cases [Table 8].

Table 8: Showing incidence of operative/post operative complications

Complication	No. of cases
Operative	None
Post Operative Wound infection: Superficial Deep	 15 Nil
Stonal obstruction (Transient) (after gastrojejunostomy)	2
Excessive bile flow through drain site after cholecystectomy	1

Discussion

An observation was made on 100 patients who underwent laparotomy for various pathological conditions of abdominal organs in whom incidental appendicectomy was performed. In this study, 36% of the patients were in their 3rd decade of life, followed by patients of 4th decade (26%), 5th decade (22%), and 6th decade (10%). No case was reported older than 60 yrs of during study period. Ludbrook and Spears (1965) had reported a significant risk of appendicitis was maximum during teens and twenties [7]. Hewitt et al

(1969) have reported a significant risk of appendicitis in patients younger than age 50 [8]. Study shown that incidence of appendiceal perforation in acute appendicitis is estimated to be in the range of 20-30% which increases to 32-72% in patients above 60 years of age. Delay in presentation was found by many authors to be the reason behind the higher rate of perforation seen in the elderly population [9]. The triad of right lower abdominal pain and tenderness, fever and leukocytosis is reported to be present in not more than 26% of patients above 60 years [10, 11].

Appendicitis is commonest during the 2nd decade (61%), followed by the 3rd decade (18%) [12].

Snyder TE et al study revealed two hundred sixty-one incidental appendectomies were performed in their study of 460 patients (60%). The procedure was most commonly performed with total abdominal hysterectomy (56%), followed by oophorectomy (15%) and exploratory laparotomy (11%). Morbidity was minimal at all ages. Microscopic pathology was found in 25% of the cases [13].

In the present study, fibrosis was observed microscopically in 15% of the specimens. 13 of these were in appendices from patients whose age ranged from 20-40 years. Catarrhal appendicitis showing polymorphonuclear cell infiltration of the muscularis mucosae was observed in 3 cases. Song JY et al study showed that only 22.7% of the appendixes in 772 cases were normal; the rest had varying degrees of pathology. The most common pathology result was adhesions, followed by fibrosis [3]. Excluding vermiform appendix, hyperplasia, congestion, involutional changes, and obliteration of the appendix followed in terms of descending frequency before the diagnosis of appendicitis was encountered [3].

Tartaglia D study revealed only 24% of macroscopically normal appendices during laparoscopy for acute lower abdominal pain are histologically normal. The majority of normal-looking appendices showed a catarrhal inflammation without serosa involvement at histology. Appendectomy should be performed in all diagnostic laparoscopies for acute lower abdominal pain showing a normal appendix [14].

Song JY et al revealed that only 3% of the women had an initial diagnosis of appendicitis. Women with an initial diagnosis of appendicitis were more likely than women without this diagnosis to have appendicitis on pathology examination (34.8% versus 3.3%; P<0.0005). However, 75.8% of the women with confirmed appendicitis did not have an initial diagnosis of appendicitis [3].

In the present study, cholecystectomy alone was the most commonly performed elective operation (64/100). Gastrojejunostomy with without vagotomy was the next most commonly performed operation (12/100). Other operations performed included cholecystectomy and choledochelithotomy nephrectomy, peritoneal adhesionolysis, abdomino-anal pull through operation, jejunojejunal anastomosis Meckelian diverticulectomy, abdominal hysterectomy, mesenteric cyst excision, repair of incisional hernia and oophorectomy. In a study by Wie HJ et al, it was concluded that incidental appendectomy at the time of benign gynecologic procedures does not increase postoperative complication rates or length of hospital stay [15]. The inclusion of incidental appendectomies in all abdominal hysterectomies could potentially decrease the morbidity and mortality rates because of increased morbidity of appendicitis in elderly women [16].

In the present series, the commonest position of appendix was retrocaecal (68%) followed by the pelvic position (18%). The positions of the vermiform appendix were shown by S. Mohammadi et al as follows: retrocaecal (71.7%), pelvic (14.7%), retroileal (6.5%), retropelvic (3.5%), colic (1.2%) and subcaecal (1.2%). The most common location of the vermiform appendix in all age groups was retrocaecal [17]. The commonest position of the appendix is retrocaecal (67.3%) followed by pelvic (16%), preileal (7.3%), post-ileal (4.6%), paracaecal (2.6%), subcaecal (1.3%) and subhepatic (0.6%). Certain positions like fixed retrocaecal, pelvic and post-ileal presented more often atypically [12]. The commonest appendicular types in males were retrocecal 10 (27%) while in females was subileal 4 (36.4%) [18].

In the present study, 74% of the total appendices were macroscopically normal. Commonest finding was the presence of faecoliths with or without bands, kins adhesions, or thickening in the wall of appendix. Catarrhal appendicitis was observed in 3 specimens. Partial or complete luminal obliteration was observed in 10 cases. Histological examination of the surgical specimen showed acute inflammation of the appendix in 1455 cases (89.42 %), fibrosed appendix in 37 cases (2.27 %), and Enterobius vermin-cularis **(**n = 23).

In 101 cases (6.2 %), the appendix was histologically normal [19]. In Tartaglia D et al study the majority of normal-looking appendices was shown to be affected by catarrhal inflammation (66%) or by phlegmonous inflammation (5%) on histopathological examination. The serosa was not involved in any of these cases [14].

Acute appendicitis was present in 19,637 (79.5 %) patients. The perforation rate [Fig. 3] was 6.3 % and was significantly higher in adult patients. The negative appendectomy rate was 15 % and was significantly higher in female and adult patients [20]. Incidental

unexpected pathological diagnoses were noted in 226 (0.9 %) appendectomy specimens. Neoplastic lesions were present in 171 cases (0.7 %); they include carcinoid, adenocarcinoma, and mucinous neoplasms [20]. The most common histopathologic diagnosis was acute appendicitis with perforation (39.61%) (M: F-1.37:1) followed by acute appendicitis (24.78%) (M: F-3:1) [21]. Histopathology of appendectomy specimens is always necessary to ensure appropriate management and rule out further dreaded conditions as tuberculosis and malignant neoplasms which also present in similar way as acute appendicitis [21].

Conclusion

An observation was made on 100 patients who underwent laparotomy for various pathological conditions of abdominal organs in whom incidental appendicectomy was performed. An incidental appendicectoy should be performed when operating in abdomen for the surgical treatment of some other diseases, where no contraindication exists. The added procedure does not increase either intra-operative risk or post-operative complications and spares the patient from the possible subsequent development of acute appendicitis. The incidence of pathological abnormalities found in the appendix when it is removed incidentally is high (26% in the present series) and in a large percentage of these patients appendicitis may have developed at a later date. Incidental appendicectomy appears to be innocuous and its routine practice in favourable and warranted cases is justified.

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