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Original Research Article

Role of liver function tests to assess severity of acute appendicitis and predict complications

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ABSTRACT

Background: Acute appendicitis is commonest surgical emergencies of abdomen. Literature shows LFT can be used as a marker of acute appendicitis and may predict severity of appendicitis.
Methods: An observational prospective study of 100 cases of acute appendicitis. Study period was from October 2018 to September 2020. Ethical clearance certificate was taken from Institutional ethics Committee. All patients underwent abdominal ultrasound, blood tests including LFT and appendectomy. Histopathology reports were analysed. Patients were divided into 2 groups- inflammatory and complicated appendicitis. Data was collected and statistically analysed using SPSS software version 19.
Results: Out of 100 patients 64% are males and 36% females. 4% are negative appendectomies. Total bilirubin elevated in 60% of inflammatory and 89% of complicated appendicitis, p value=0.0053 (significant), sensitivity-62%. Direct bilirubin elevated in 88% of inflammatory and 96% of complicated appendicitis, p value=0.05 (significant), sensitivity-69%. ALT, AST not raised in both groups. ALP elevated in 81% of inflammatory and 82% of complicated appendicitis with sensitivity-70.5%.
Conclusions: LFT can be used to diagnose, assess severity and predict complications of acute appendicitis with elevations of total bilirubin, direct bilirubin and ALP being most useful.

Keywords: Appendicitis, LFT, Complications

INTRODUCTION

Acute appendicitis remains one of the most common diseases faced by general surgeons.[1] Though most commonly performed surgery of abdomen, it is still difficult to diagnose, thereby leading to high negative appendectomy rate. The delayed diagnosis depending on clinical acumen alone leads to increased mortality and morbidity.[2-4]

Appendicitis is notorious in its ability to simulate other condition and in the frequency it can be mimicked by other pathological conditions.[5]

Various scores combining clinical features and laboratory investigations have been developed to reach the diagnosis however till now there is no confirmatory laboratory marker for preoperative diagnosis of acute appendicitis and appendicular perforation.[6]

CT scan is a reliable diagnostic modality but has limitations like increased radiation and cost.[7]

Therefore much interest exists in finding ways to diagnose and estimate extent of acute appendicitis before relying on radiological tests.[8]

A simple cheap biochemical test that is specific for acute appendicitis useful in conjunction with clinical finding in predicting diagnosis of appendicitis or appendicitis with complications.[9,10]

In appendicitis transmigration of bacteria occurs into portal vein through which it reaches liver. In liver it is cleared by reticuloendothelial system upto certain limit.

When the load is more than functional capacity of Kupffer cells of liver it leads to parenchymal damage causes release of cytokines like TNF, IL6 which interferes with physiology of excretion of bile leading to hyperbilirubinemia and derangements of liver functions.[11]

Liver function test is one of the marker to identify and diagnose acute appendicitis and its complications however available literature are limited and views are conflicting.

In this study it was proposed to evaluate and validate use of derangement in LFT to predict appendicitis and its severity.

Aims and objectives

To analyze role of LFT parameters to predict acute appendicitis and its severity.

METHODS

This was an observational prospective study of 100 cases of acute appendicitis done in Department of General Surgery KIMS, Narketpally from October 2018 to September 2020. Ethical clearance was taken from Instituitional Ethics committee. Cases were selected by following selection criteria.

Inclusion criteria

All operated patients of acute appendicitis.

Exclusion criteria

Patients with documented biliary, hemolytic or liver disease.

After taking informed consent all patients included in the study were subjected to routine blood investigations including LFT, USG abdomen. After appendectomy histopathology reports were collected.

Patients were divided into two groups inflammatory and complicated appendicitis.

Data was collected and statistically analyzed using SPSS Software version 19 to assess relationship between LFT in acute appendicitis and complicated appendicitis.

RESULTS

Table 1 shows out of 100 cases, maximum cases were found in age group between 20-29 years.

Table 1: Distribution of cases according to age.

Age group (yrs)	Number of cases (n=100)	Percentage
0-19	31	31
20-29	33	33
30-39	13	13
40-49	13	13
>50	10	10

Table 2 shows out of 100 cases, 64% were males, 36% were females.

Table 2: Distribution of cases according to sex.

Gender	Number of cases (n=100)	Percentage
Male	64	64
Female	36	36

Out of 100 cases, 4 cases (4%) were negative appendectomies.

Out of 96 cases of pathological appendix, 68 cases (71%) were with inflammed appendix. 28 cases (29%) were with gangrenous or perforated appendix.

Table 3: Relationship between total bilirubin and appendicular pathology.

Total bilirubin	Inflammed appendix (n=68)	Gangrenous/ perforated appendix (n=28)	Total
Elevated	41	25	66
Normal	27	3	28

P value =0.0053 (significant)

Out of total 96 cases of pathologic appendix, 66 cases (68%) had elevated bilirubin, 28 cases (32%) had normal levels.

Out of 68 cases of inflammed appendix, 41 (60.2%) cases had elevated total bilirubin and 27 (40%) cases had normal total bilirubin.

Out of 28 cases of perforated appendix, 25 (89%) cases had elevated total bilirubin and 3 (11%) cases had normal total bilirubin.

Table 4: Relationship between direct bilirubin and appendicular pathology.

Direct bilirubin	Inflammed appendix (n=68)	Perforated appendix (n=28)	Total
Elevated	60	27	87
Normal	8	01	9

P value =0.05 (significant).

Out of 96 cases of pathological appendix 87 (90%) cases had elevated direct bilirubin and 9 cases (10%) had normal values.

Out of 68 cases of inflammed appendix, 60 (88%) cases had elevated direct bilirubin and 8 (12%) cases had normal direct bilirubin.

Out of 28 cases of perforated appendix, 27 (96%) cases had elevated direct bilirubin and 01 (4%) cases had normal direct bilirubin.

Table 5: Relationship between AST (SGOT) and appendicular pathology.

AST	Inflammed appendix (n=68)	Perforated appendix (n=28)	Total
Elevated	10	5	15
Normal	58	23	81

Out of 96 cases of pathological appendix 15 cases (15.6%) had elevated AST, 81 cases (84.4%) had normal AST levels.

Out of 68 cases of inflammed appendix, 10 cases (15%) elevated AST levels and 58 cases (85%) had normal AST levels.

Out of 28 cases of perforated appendix, 5 cases (18%) had elevated AST levels and 23 cases (82%) had normal AST levels.

Table 6: Relationship between ALT (SGPT) and appendicular pathology.

ALT	Inflammed appendix (n=68)	Perforated appendix(n=28)	Total
Elevated	5	1	6
Normal	63	27	90

Out of 96 cases, 6 (6.25%) cases had elevated ALT, 90 (93.75%) cases had normal ALT levels.

Out of 68 cases of inflammed appendix, 5 cases (7%) elevated ALT levels and 63 cases (93%) had normal ALT levels.

Out of 28 cases of perforated appendix, 1 cases (4%) had elevated ALT levels and 27 cases (96%) had normal ALT levels.

Table 7: Relationship between alkaline phosphate and appendicular pathology.

Alkaline phosphate	Inflammed appendix (n=68)	Perforated appendix (n=28)	Total
Elevated	55	23	78
Normal	13	5	18

Out of 96 cases, 78 (81.25%) cases had elevated ALP, 18 (18.75%) cases had normal ALP levels.

Out of 68 cases of inflammed appendix, 55 cases (81%) elevated ALP levels and 13 cases (19%) had normal ALP levels.

Out of 28 cases of perforated appendix, 23 cases (82%) had elevated ALP levels and 5 cases (18%) had normal ALP levels.

DISCUSSION

This is a prospective study of 100 patients with a purpose to find out relationship between LFT parameters and appendicular pathologies.

Out of 100 cases, 96 (96%) cases were found to have pathologic appendix, 4 (4%) cases had normal appendix.

In this study, out of 96 cases of pathologic appendix 68% had elevated total bilirubin levels.

In this study, out of 68 cases of inflammed appendix (60%) cases had elevated total bilirubin and out of 28 cases of perforated appendix (89%) cases have elevated total bilirubin, with p value of 0.0053 (significant).

In a study by Mishra et al, 53.3% of total cases of pathological appendix shows raised total bilirubin. 81.25% cases of complicated appendix and 21.42% of inflamed appendix had raised total bilirubin.[11]

In a study by Yadav et al, 36.25% of total cases had raised total bilirubin levels.[7] In a study by khan et al, 86.6% of total cases had raised total bilirubin levels.[12]

In this study, out of 96 cases of pathological appendix 87 (90%) cases had elevated direct bilirubin. Out of 68 cases of inflammed appendix, 60 (88%) cases had elevated direct bilirubin. Out of 28 cases of perforated appendix, 27 (96%) cases had elevated direct bilirubin.

In a study by Yadav et al direct bilirubin was raised in 90% cases.[7] In a study by Khan et al found raised serum bilirubin in 86% cases with predominantly conjugated hyperbilirubinemia.[12]

In this study, out of 96 cases of pathological appendix 15 cases (15.6%) had elevated AST. Out of 68 cases of inflammed appendix, 10 cases (15%) had elevated AST levels. Out of 28 cases of perforated appendix, 5 cases (18%) had elevated AST levels.

In study by Mishra et al, 28% cases of pathological appendix had elevated AST; 50% cases of complicated appendicitis had raised AST.[11]

In study by Yadav et al, 28.75% cases had elevated AST.[7]

In a study by Khan et al, 38.7% of cases had elevated AST.[12]

In this study Out of 96 cases, 6 (6.25%) cases had elevated ALT. Out of 68 cases of inflammed appendix, 5 cases (7%) elevated ALT levels had elevated ALT levels. Out of 28 cases of perforated appendix, 1 cases (4%).

In study by Mishra et al, 8.3% of total cases had elevated ALT. 15.6% of complicated appendix had elevated ALT.[11]

In a study by Yadav et al, 32.5% of cases had elevated ALT.[7] In a study by Khan et al, 26.54% cases showed raised ALT.[12]

In this study, out of 96 cases, 78 (81.25%) cases had elevated ALP. Out of 68 cases of inflammed appendix, 55 cases (81%) had elevated ALP levels. Out of 28 cases of perforated appendix, 23 cases (82%) had elevated ALP levels.

In a study by Mishra et al, 10% of total cases had elevated ALP, 18.75% of complicated appendix had elevated ALP.[11]

In a study by Yadav et al, 82.5% of cases had elevated ALP.[7] In a study by Khan et al, 48.97% of cases had elevated ALP.[12]

Dieulafoy study gave an evidence about the bacterial translocation from inflamed gastrointestinal tract and peritoneum to liver by portal vein that leads to development of hepatitis and pyogenic liver abscess.[13]

Translocation of pathological organisms from the inflammed, gangrenous or perforated appendix to liver occurs through portal vein. In liver increased bacterial load causes release of cytokines like TNF, IL-6 etc. it leads to damage of liver parenchyma and derangement in liver function tests.[11]

Derangement of LFT particularly total and direct bilirubin and alkaline phosphatase in acute appendicitis can help is anticipating complications like perforation, gangrene etc.

CONCLUSION

LFT can be used to diagnose, assess severity and predict complications of acute appendicitis. Elevation of total bilirubin, direct bilirubin and alkaline phosphatase appear to be most useful (amongst the LFT parameters) in predicting complications.

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