



## TO EVALUATE THE VALUE OF CRP AND LACTATE IN BOWEL OBSTRUCTION AS PREDICTOR OF STRANGULATION.

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**ABSTRACT** **BACKGROUND:** Intestinal obstruction is one of the commonest clinical problems encountered in surgical practice. One of the grave complications of intestinal obstruction is strangulation, which requires an emergency laparotomy for management. This study was conducted to emphasise the significance of early estimation of rise in serum C-reactive protein and D- lactate levels. **AIMS AND OBJECTIVE:** The aim of this retrospective study was to examine whether various laboratory parameters could predict viability of strangulation in patients with bowel obstruction. **MATERIAL AND METHODS:** Hospital based prospective study was performed on 50 patients admitted in Shere Kashmir Institute of Medical Sciences, Srinagar in various surgical units with diagnosis of acute intestinal obstruction and underwent explorative Laparotomy. **RESULTS:** CRP test sensitivity was 84.00%, specificity was 81.67%, PPV was 74.91% and NPV was 87.89% to detected the obstruction with strangulation when using a cut off value of 60 mg/L. D-lactate test sensitivity was 80.00%, specificity was 90.00%, PPV was 84.30% and NPV was 87.10% to detected the obstruction with strangulation when using a cut off value of 4.5 mmol/L. **CONCLUSIONS:** Serum CRP and D-lactate can be useful and reasonable markers for predicting strangulation in cases of acute intestinal obstruction in an emergency setting.

**KEYWORDS :** Crp, D-lactate, Intestinal Obstruction.

### INTRODUCTION:

Intestinal obstruction is one of the commonest clinical problems encountered in surgical practice. One of the grave complications of intestinal obstruction is strangulation, which requires an emergency laparotomy for management. Bowel ischemia may arise from a number of causes affecting the arterial and venous compartments of the mesenteric circulation. The rapid onset of ischemia and the potential rapidity with which bowel infarction may occur explain the lethality of this disease. Ischemia, which complicates 7% to 42% of bowel obstruction, significantly increase mortality associated with bowel obstruction [1]. The most common cause of bowel gangrene secondary to mechanical obstruction is strangulated hernia in India and post-operative adhesions in developed countries. Bowel gangrene is a major abdominal catastrophe associated with high mortality rate. This increased mortality is attributed to difficulty in diagnosing the condition early, the late presentation of the patient to the hospital and non-availability of precise diagnostic tool for assessing bowel gangrene. Various biochemical markers, such as values of serum tumor necrosis factor $\alpha$ , C-reactive protein (CRP), interleukin 6, D-lactate, D - dimer, alpha glutathione Stransferase, intestinal fatty acid binding protein (I-FABP), creatine kinase B, isoenzymes of lactate dehydrogenase, procalcitonin, alkaline liver phosphatase, and urinary phosphate have been studied in cases of intestinal obstruction and/or intestinal ischemia/strangulation mainly in animal models or tissues with few in clinical settings, with relatively few studies in humans on finding a biomarker of preoperative strangulation[2,3]. This study was conducted to emphasise the significance of early estimation of rise in serum C- reactive protein and D- lactate levels followed by early intervention which helps in reducing the morbidity and mortality caused by bowel gangrene following obstruction.

### AIMS AND OBJECTIVE:

The aim of this retrospective study was to examine whether various laboratory parameters could predict viability of strangulation in patients with bowel obstruction. Aims of our study were to evaluate

role of serum C – reactive protein and serum D – lactate in combination as markers of bowel strangulation.

### MATERIAL AND METHODS:

#### STUDY TYPE:

Hospital based prospective study. **Study duration:** May 2017 to December 2017. **Study place:** Department of General surgery Shere Kashmir Institute of Medical Sciences, Srinagar. The study was performed on 50 patients admitted in various surgical units with diagnosis of acute intestinal obstruction and underwent explorative Laparotomy.

#### INCLUSION CRITERIA:

All patients aged 18-60 years with suspicion of acute intestinal obstruction and underwent exploratory Laparotomy in the emergency operation.

#### EXCLUSION CRITERIA:

1) Patients with coexisting medical illnesses, such as chronic kidney disease, any cardiac disease, diabetes mellitus and coagulopathy. (2) Patients with any intra-operative finding apart from simple or strangulated bowel obstruction. Acute intestinal obstruction was diagnosed by history, clinical examination and imaging modalities. Data collection Based on the various intra-operative finding causing acute intestinal obstruction all patients divided into two groups- A – Obstruction with strangulation. B – Obstruction without strangulation. Blood investigation was sent for serum C- reactive protein (CRP) and serum D-lactate. Measurement of serum CRP levels Quantitative assessment of serum CRP was done using human CRP kit based on the principle of solidphase enzyme-linked immunosorbent assay. For calculation of sensitivity and specificity cut of value of CRP was used 60 mg/L. Measurement of serum D-lactate levels D-lactate was estimated by using the D-lactate assay kit based on the principle of proportionate colour generation as a result of oxidation of D-lactate by D-lactate dehydrogenase. For calculation of sensitivity and specificity

cut of value of D-lactate was use 4.5 mmol/l.

#### STATISTICAL ANALYSIS:

All data were analysed on EPI-info statistical software. Qualitative data was expressed in the form of proportion. Quantitative data was expressed in mean  $\pm$  SD. Qualitative data was compared by Chi square test. Unpaired t test was used to infer the difference in means.

#### RESULT:

The mean age in group A was 46.25 $\pm$ 18.29 years and mean age in group B was 47.03 $\pm$ 19.12 years. All male patients were in group A and 73.33% patients were male & 26.67% patients were female in group B. Sociodemographic variable in both group were comparable.

**Table 1: Serum C- reactive level.**

	Group-A (Intestinal obstruction with strangulation)		Group-B (Intestinal obstruction without strangulation)	
	Mean	SD	Mean	SD
CRP level	110.5	27.14	38.96	17.4
P Value	0.001			

Group A (Intestinal obstruction with strangulation) Group B (Intestinal obstruction without strangulation) Mean SD Mean SD CRP level 110.50 27.14 38.96 17.40 P value 0.001. As per above Table shows that mean CRP level was 110.50 $\pm$ 27.14 mg/dl in group A and mean CRP level was 38.96 $\pm$ 17.40 mg/dl in group B. The mean CRP level differences in both groups were statistically significant.

**Table 2: Sensitivity and Specificity for elevated serum CRP level.**

CRP level	Group-A (Intestinal obstruction with strangulation)	Group-B (Intestinal obstruction without strangulation)
Increased	17	6
Normal	3	24
Total	20	30
P value	0.001	
Sensitivity	84.00%	
Specificity	81.67%	
Positive predictive value	74.91%	
Negative predictive value	87.89%	

As per above table CRP level Group A (obstruction with strangulation) Group B (obstruction without strangulation) Increased 17/6, Normal 3/24, Total 20/30. P value 0.001 Sensitivity 84.00% Specificity 81.67% Positive predictive value 74.91% Negative predictive value 87.89% to detected the obstruction with strangulation when using a cut off value of 60 mg/L.

**Table 3: serum D-lactate level.**

	Group-A (Intestinal obstruction with strangulation)		Group-B (Intestinal obstruction without strangulation)	
	Mean	SD	Mean	SD
D-lactate	5.82	0.62	2.87	1.04
P Value	0.001			

As per above Table shows that mean D-lactate level was 5.2 $\pm$ 0.62 mmol/L in group A and mean D-lactate level was 2.87 $\pm$ 1.04 mmol/L in group B. The mean D-lactate level differences in both groups were statistically significant.

**Table 4: TLC.**

	Group-A (Intestinal obstruction with strangulation)		Group-B (Intestinal obstruction without strangulation)	
	Mean	SD	Mean	SD
TLC	16025.50	4669.45	8560.66	3187.38
P Value	0.001			

As per above Table shows that mean TLC level was 16025.50  $\pm$  4669.45 mm<sup>3</sup> group A and mean TLC level was 8560.66 $\pm$ 3187.38mm<sup>3</sup> group B. The mean TLC level differences in both groups were statistically significant.

#### DISCUSSION:

Hospital based prospective study was conducted on 50 patients admitted in Shere Kashmir Institute of Medical Sciences, Srinagar in various surgical units with diagnosis of acute intestinal obstruction and explorative laparotomy done. Acute intestinal obstruction was diagnosed by history, clinical examination and imaging modalities. Strangulation is a complication associated with acute intestinal obstruction and requires prompt diagnosis. This is easier said than done, especially in an emergency setting. Moreover, reported mortality rates after acute intestinal obstruction have found association with delay in surgical management with progression to strangulation in many cases [4,5]. In a study by Demir et al done for identifying factors predicting the need for surgery, elevated CRP was significantly associated with bowel gangrene and an underlying predictive value for the need of surgery [6]. Another study by Lin et al for evaluation of risk factors for intestinal gangrene identified that elevated serum CRP was associated with bowel gangrene [7]. Most of the lactate found in human body is L-lactate. Van Noord studied 49 patients with chronic gastrointestinal ischemia and found that L-lactate elevation was significantly increased in ischemia as compared with the non-ischemia group [8]. In our study CRP test sensitivity was 85.00%, specificity was 80.67%, PPV was 73.91% and NPV was 88.89% to detected the obstruction with strangulation. Mean CRP level was 110.50 $\pm$ 27.14 mg/dl in group A and mean CRP level was 38.96 $\pm$ 17.40 mg/dl in group B. The mean CRP level differences in both groups were statistically significant. Ajay K pal et al observed that serum values of CRP were significantly higher in patients with strangulated bowel obstruction as compared with simple bowel obstruction (116 vs. 40 mg/L respectively, p0.05), the values of TLC were also higher in the strangulated bowel obstruction (10,500 vs. 16,800 per  $\mu$ L) [9]

#### CONCLUSION:

Serum CRP and D-lactate can be useful and reasonable markers for predicting strangulation in cases of acute intestinal obstruction in an emergency setting.

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