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Original Research Article

A COMPARATIVE STUDY OF PERITONITIS ASSOCIATED HYPERLACTAMIA FOR EVALUATING MORTALITY IN SECONDARY PERITONITIS

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Abstract

Lactate levels are normally maintained at less than 1.5 mmol/L using a delicate balance between production and clearance (by liver and kidneys). Hyperlactemia has shown correlation with higher mortality. In our study on 30 indoor patients of perforation peritonitis in SMS medical college, Jaipur – we found that higher lactate level (> 4) is associated with higher ventilator need (80%) and hence higher mortality (60%).

Keywords: Hyperlactemia.

1. Introduction:

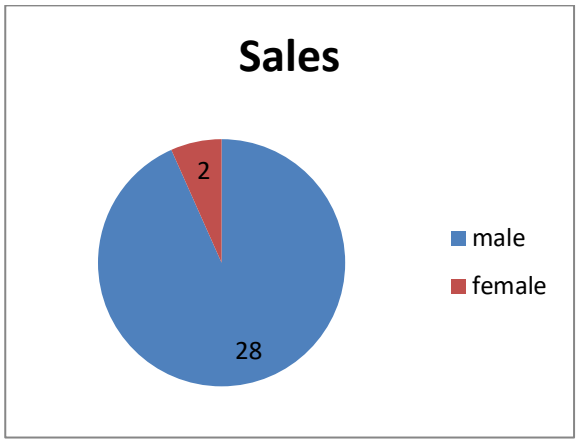
Gastrointestinal perforations constitute one of the commonest surgical emergencies encountered by surgeons.[1,2] Management of these patients continues to be highly demanding despite the advances made in diagnosis and surgical therapy. The etiological spectrum of perforation peritonitis in India differs significantly from its western counter parts.[3-5] Peritonitis usually presents as an acute abdomen. Local findings include abdominal tenderness, guarding or rigidity, distension, diminished bowel sounds. Systemic findings include fever, chills or rigor, tachycardia, sweating, tachypnea, restlessness, dehydration, oliguria, disorientation and ultimately shock.[6] Approximately 1500 mmol of lactate is produced daily by muscle fibers, brain, skin, red blood cells and intestine as an end product of glycolysis. Lactate levels are normally maintained at less than 1.5 mmol/L by a delicate balance between production and clearance (by liver and kidneys). Anything that affects lactate production, clearance or both leads to hyperlactatemia; this is seen in a variety of conditions such as sepsis, shock, cardiac arrest, tissue hypoxia, burns and some pharmacological agents (linezolid, metformin, theophylline etc.[7,8] Various physiological alterations such as increased glycolysis, low pyruvate dehydrogenase activity and reduced clearance due to liver hypoperfusion come into play in sepsis causing a shift towards anaerobic metabolism and hyperlactatemia, which is characteristic of septic states.[9-13] Hyperlactemia has shown correlation with higher mortality – results from the Surviving Sepsis Campaign showed that patients with lactate values greater than 4 mmol/L (with or without hypotension) had a significantly higher in-hospital mortality than those with lactate less than 4 mmol/L, echoing the work of Broder and Weil published many years ago[14] Our study was carried out to highlight the post-operative outcome associated with lactic acid level in post-operative cases of perforation peritonitis (diffuse). Secondary aim is to study association of postoperative mortality with age, sex, comorbidity, pre-operative haemoglobin**,** and to evaluate post-operative complication and causes of morbidity in peritonitis patient undergoing laparotomy.

2. Patients and method:

A total of 30 patients of perforation peritonitis were studied who were admitted to department of surgery, SMS Medical College Jaipur, Rajasthan, India. All patients underwent exploratory laparotomy. Cases were studied with respect to clinical features at the time of presentation, comorbidities, radiological investigations, operative findings, and postoperative course. After establishing the clinical diagnosis of perforation peritonitis, the patients were prepared for exploratory laparotomy. On performing exploratory laparotomy, the operative findings were noted and the source of peritonitis was found and managed accordingly. All patients were then treated in the postoperative ward initially under the cover of parenteral broad-spectrum antibiotics and fluids; orals were started on the appearance of bowel sounds.

3. Results and discussion:

3.1 Sex: perforation is more common in males



3.2 Age distribution: Perforations are more common in young age. 50% of total perforations are present in 21-40 age group, whereas mortality is more common in higher age group (≥ 60) i.e., 75%.

S. No		≤ 20	21-30	31-40	41-50	51-60	≥60
1.	No. of patients	4	9	6	2	5	4
2.	Mortality (No.)	0	1	1	0	1	3 (75%)

3.3 Pre op. Hemoglobin level: Severe anemia is associated with higher mortality.

S. No	gm%	≤ 8	8-12	≥ 12
1.	No. of patients	4	14	12
2.	Mortality (No.)	3 (75%)	1	2

3.4 Pre op. TLC: Septicemia is one of the major factors of higher mortality.

S. No		≤ 4000	4000-10000	10000-13000	≥ 13000
1.	No. of patients	3	13	8	6
2.	Mortality (%)	0	1	1	4 (67%)

3.5 Types of perforation: Illeal and peptic perforations are equally common (47% each) but illeal perforations are associated with more mortality than other types of perforations. Among total deaths 83% deaths are reported in illeal perforations.

S. No		Peptic	Jejunal	Illeal	Large intestine
1.	No. of patients	14	1	14	1
2.	Mortality (%)	1	0	5	0

3.6 Correlation of pre-operative lactate with post op. need of vasopressor and ventilator and associated mortality: Higher lactate level (≥ 4.0) is associated with higher ventilator need (80%) and hence higher mortality (60%).

S. No		Pre-op lactate	Vasopressor need	Ventilator need	Mortality
1.	≤ 1.5	17	3	2	2
2.	1.5 - 4.0	8	8	2	1
3.	≥ 4.0	5	3	4	3

MASTER TABLE

S.No	NAME	Cr. No.	Age	Sex	Date of Admission	Date of Operation	Provisional Diagnosis	Final Diagnosis	Site of perforation	Hb	TLC	Platelet	Pre-op Arterial Lactate	Post-op Arterial Lactate	Post-op vasopressor	Post-op ventilator needs	Post-op Mortality
1.	Dhansi ram	101202993839	80	Male	3/16/2021	3/17/2021	Perforation Peritonitis	Ileal perforation Peritonitis	Ileum	11.2	7.9	2.4	1.2	0.7	Yes	Yes	Yes
2.	Hotam	1012104278746	45	Male	4/2/2021	4/2/2021	Perforation Peritonitis	Ileal perforation Peritonitis	80cm proximal to ICJ	11.8	9.56	2.46	1.4	0.9	No	No	No
3.	Guvindra	1012103928682	17	Male	3/24/2021	3/25/2021	Perforation Peritonitis	Perforation Peritonitis	Ileal perforation Peritonitis	14.4	7.7	1.88	1.9	1.5	Yes	No	No
4.	Raju lal	1012104109553	70	Male	3/30/2021	3/30/2021	Perforation Peritonitis	Ileal perforation Peritonitis	posterior wall of stomach	15.1	1.23	2.34	5.8	1.1	No	Yes	No
5.	Sachin	1012104273418	22	Male	4/1/2021	4/2/2021	Perforation Peritonitis	Ileal perforation Peritonitis	Terminal ileum	13.5	10.26	0.94	3.4	1.0	Yes	Yes	Yes
6.	Ramcharan	1012104313771	32	Male	4/2/2021	4/3/2021	Perforation Peritonitis	Gastric perforation Peritonitis	Prepyloric perforation	11.2	9.7	3.7	1.1	0.8	No	No	No
7.	Delip singh	1012104315137	16	Male	4/3/2021	4/3/2021	Perforation Peritonitis	Gastric perforation Peritonitis	Prepyloric	13.7	4.9	1.2	0.7	0.6	No	No	No
8.	Hanuman ram	1012103425770	48	Male	3/15/2021	4/16/2021	Perforation Peritonitis	Ileal perforation Peritonitis	50cm proximal to ICJ	15	12.6	3.9	1.9	1.5	Yes	No	No
9.	Durgesh solanki	1012103928160	28	Male	4/6/2021	4/7/2021	Perforation Peritonitis	Duodenal perforation Peritonitis	First part of duodenum	12.7	4.2	1.9	0.9	0.8	No	No	No
10.	Dinesh	1012105026007	30	Male	5/30/2021	5/31/2021	Perforation Peritonitis	Ileal perforation Peritonitis	50cm proximal to ICJ	15	7.9	2.7	1.5	0.7	No	No	No
11.	Sonu	1012104975617	21	Male	4/16/2021	7/16/2021	Perforation Peritonitis	Peptic perforation Peritonitis	Pylorus of stomach	12.7	12.2	4.8	3.0	2.5	Yes	No	No
12.	Deelip	1012104315137	16	Male	4/3/2021	4/3/2021	Perforation Peritonitis	Peptic perforation Peritonitis	Pylorus perforation peritonitis	12.2	7.9	4.2	1.0	0.6	No	No	No
13.	Vijay	101210687872	20	Male	6/25/2021	6/25/2021	Perforation Peritonitis	Peptic perforation Peritonitis	Pylorus perforation peritonitis	11	7.8	2.9	1.1	1.5	No	No	No
14.	Devilal	1012106028405	53	Male	4/16/2021	4/16/2021	Perforation Peritonitis	Ileal perforation Peritonitis	70cm proximal to ICJ	11	7.5	4.2	1.0	0.5	No	No	No
15.	Ravi	1012104710818	27	Male	4/9/2021	4/9/2021	Perforation Peritonitis	Peptic perforation Peritonitis	Prepyloric	11	7.7	3.3	1.1	1.0	No	No	No
16.	Kailash	1012104715712	64	Male	4/10/2021	4/10/2021	Perforation Peritonitis	Peptic perforation Peritonitis	Prepyloric	12	11.2	3.2	1.2	1.0	Yes	No	No
17.	Ramcharan	1012104313771	32	Male	4/2/2021	4/3/2021	Perforation Peritonitis	Peptic perforation Peritonitis	Prepyloric	11	14.3	3.7	1.1	0.8	No	No	No
18.	Ravi	101210476818	27	Male	4/9/2021	4/9/2021	Perforation Peritonitis	Peptic perforation Peritonitis	Prepyloric	12	4.3	3.4	1.2	0.8	No	No	No
19.	Mithlesh	1012103661767	30	Female	3/19/2021	3/19/2021	Perforation Peritonitis	Ileal perforation Peritonitis	130cm distal to DJ	12	12.7	7.1	2.2	1.5	Yes	No	No

20.	Raju	1012102445882	31	Male	2/25/2021	2/25/2021	Perforation Peritonitis	Ileal perforation Peritonitis	100cm proximal to ICJ	8.2	7.7	4.2	1.0	0.7	No	No	No
21.	Ramesh	101210263736	SS	Male	3/2/2021	3/2/2021	Perforation Peritonitis	Peptic perforation Peritonitis	PraPyloric	8.2	14.7	3.9	2.2	1.9	Yes	Yes	Yes
22.	Kailash	1012102768553	35	Male	3/2/2021	3/3/2021	Perforation Peritonitis	Ileal perforation Peritonitis	80cm proximal to ICJ	15.2	16.7	3.9	4.5	4.1	No	Yes	Yes
23.	Kailash	102104715712	64	Male	4/10/2021	4/10/2021	Perforation Peritonitis	Ileal perforation Peritonitis	150 cm proximal to ICJ	8.8	14.2	4.9	1.2	1.0	No	Yes	Yes
24.	Chandravati devi	101210796689	60	Female	7/18/2021	7/18/2021	Perforation Peritonitis	Multiple ileal perforation Peritonitis	Multiple perforation in ileum	8.5	17000	4.9	8.4	7.9	Yes	Yes	Yes
25.	Laxman	1012105954028	52	Male	5/24/2021	5/25/2021	Perforation Peritonitis	Peptic perforation Peritonitis	Prepyloric	13.2	11000	3.9	4.3	3.5	Yes	No	No
26.	Surendra	101210904847	25	Male	3/1/2021	3/2/2021	Perforation Peritonitis	Sigmoid perforation Peritonitis	Sigmoidal	12.4	11.4	4.9	1.9	1.4	No	No	No
27.	Madanlal	1012109617782	30	Male	2/25/2021	2/26/2021	Perforation Peritonitis	Jejunal perforation Peritonitis	30 cm distal to DJ	11.2	14000	5.3	2.3	1.7	No	Yes	No
28.	Gajaram	1012109200667	32	Male	2/24/2021	2/25/2021	Perforation Peritonitis	Ileal perforation Peritonitis	90 cm proximal to ICJ	8.9	6.7	3.8	1.1	0.8	No	No	No
29.	Deenu	10121917260	40	Male	2/23/2021	2/24/2021	Perforation Peritonitis	Pylorus perforation Peritonitis	Pylorus	11.3	13000	4.4	0.8	0.9	No	No	No
30.	Chote ram	1012109177379	37	Male	2/27/2021	2/28/2021	Perforation Peritonitis	Multiple ileal perforation Peritonitis	Multiple perforation in ileum	14	7000	5.5	1.4	1.2	Yes	No	No

4. Summary:

In our study perforation are more common in males (93%), moreover perforations are more common in young age group. 50% of total perforations are present in 21-40 age group, but mortality is more common in higher age group (> 60) i.e.,75%. 75% deaths were reported in patients with Hb < 8gm%. 67% deaths were associated with septicemia (TLC >13000). Illeal and peptic perforations are equally common (47% each) but 83% deaths were reported in illeal perforations. Higher lactate level (> 4) is associated with higher ventilator need (80%) and hence higher mortality (60%).

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