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Incidence and Significance of Intra-Operative Peritoneal Fluid Fungal Culture in Patients of Perforated Peptic Ulcers

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Abstract
Background: *Perforation peritonitis is the most common surgical crisis in India. It is polymicrobial in nature. Till recently the emphasis has been given on identification of microbial flora associated with perforation peritonitis. The aim of this study was to determine the significance of intraoperative peritoneal fluid culture of fungus and to establish the indications for treatment.*
Methods: *Fifty three patients admitted with a Perforated peptic ulcer (PPU) were studied. Clinical data and peritoneal fluid for culture were collected. Risk factors for a positive peritoneal fluid culture of fungus and outcome were evaluated and related to the development of surgical site infection, duration of hospital stay and mortality rate.*
Results: *53 with a PPU were included; 24 (45.2 per cent) had positive peritoneal fluid fungal culture. Age, preoperative organ failure, delay in operation, high Mannheim Peritonitis Index (MPI) and Acute Physiology and Chronic Health Evaluation (APACHE) II scores, and preoperative antibiotic therapy were risk factors for a positive fungal culture. Sex and an MPI score of 20 or more remained significant in multivariate analysis (P< 0·001). Patients with a positive fungal culture had a higher incidence of surgical site infection, a longer hospital stay and a significantly higher mortality rate, especially when this was combined with a high MPI score.*
Conclusion: *Positive peritoneal fungal culture was common and was a significant risk factor for adverse outcome in patients with a PPU. A high MPI score could be used as an indicator for prophylactic antifungal therapy.*
Keywords: *Perforation peritonitis ,peritoneal fungal culture, indications for treatment.*

INTRODUCTION

Peritonitis is caused most commonly by perforation of the hollow viscus and grave consequences of the disease are attributed to the microbial infection of the peritoneal cavity. Factors foretelling outcome in cases of perforation peritonitis are well known and have been well acknowledged in the construction of various scoring systems. [1,2] Increasing awareness of worse outcome after fungalco-infection, [3,4,5] and the knowledge that intra-abdominal microbial-ogical findings do not correlate with severity of

illness as judged by the scoring systems, impelled usto conduct this study.

METHODS

The study was conducted in Index Medical College Hospital& Research Centre, Indore during year 2015-16. 53 cases of perforated peptic ulcers (confirmed intra-operatively) were prospectively followed at the Department of Surgery. The ethical committee of the institute approved the protocol. Pre operative clinical data were recorded which included age, sex, condition on admission, duration of sign and symptoms, pre operative use of antibiotics and duration of operation. For each patient a MPI and APACHE II score were assigned.

All traumatic blunt or penetrating hollow viscous injuries, terminal small bowel and colonic perforations were excluded. Peritoneal fluid samples were collected, intra-operatively, under aseptic precautions. Subsequent cultures from drain and main wound were sent if the first culture came out to be positive. Blood for fungal culture were taken only when temperature was above 39 ◦F.

Microbial culture was done on Sabouraud's dextrose agar slants (at room temperature for 48 hours). The colony characteristics were recorded as a mild, moderate or heavy. For the identification of fungi, colony smear was done. Germ tube test (single yeast colony was inoculated in 1 mL of the human serum and incubated at 37 ºC for 2hours) confirmed the presence of *Candida*.

The outcomes were determined from case-notes which include duration of stay, duration of central line, morbidity, mortality and surgical site infection.

RESULTS

The study included 53 cases of perforated peptic ulcers [Male 46 and Female 7].35 patients (66%) had gastric perforation while 18 patients (34%) had pyloro-duodenal ulcers with female showing slight higher incidence of perforated gastric ulcers than male and vice versa in cases of perforated duodenal ulcers. Samples of 24(45.2%) had fungal growth on culture with candida being most frequently isolated species (41.51%) (table 1).

Aspergillus was isolated in 2(3.7%) samples. 29 (54.8%) samples did not show any growth. Patients with age ≥50 years were found to have a higher positive fungal culture outcome(45.83%) whereas patients below 30 years were least affected (16.67%) (table 2).In this series 70% of the patients who were positive for fungal culture had some form of systemic disease in comparison only 30% patients with negative fungal culture had systemic disease.

Patients with MPI score of 26 or more and APACHE 2 score of >12 in our study were found to be more susceptible to fungal peritonitis. Such patients can be considered for anti fungal treatment.(Table 4)

The mean duration for CVP line in our study was 7.7 day, with the patients having fungal peritonitis the mean being raised to 12 days in comparison to the mean of four days in non fungal peritonitis patients. This is indisputable of serious post operative problem and shows a protracted post operative course with an increase in the expenditures.

In our study total of 3 patients with candia-peritonits (18.18%) was comparatively higher than in non fungal peritonits cases (3.44%). It was found that mortality was higher in age group ≥50 yrs (3out of 4 deaths).(Table 5)

Table 1: Incidence of Positive Fungal Cultures

S.No		Gastric Culture N=35		Duodenal Culture N=18		Male N =46		Female N=7	
1	Fungal (Aspergillus +Candida)	14	40%	10	55.55%	19	41.30%	5	71.42%
2	+Ve Candida Cultures	13	37.14%	9	50%	18	39.13%	4	57.14%
3	+Ve Aspergillus Cultures	1	2.86%	1	5.55%	1	2.17%	1	14.27%

Table 2: Age Related Incidence of Fungal Culture Outcome

S.NO	AGE INTERVALS	No. of Pts n=53		Fungal +ve		Candida +ve		Aspergillus +ve		None	
1	10-29	12	22.64%	4	16.67%	4	18.18%	0	0%	8	27.58%
2	30-49	21	39.62%	9	40.90%	9	40.9%	0	0%	12	41.37%
3	≥50	20	37.74%	11	45.83%	9	40.90%	2	100%	9	31.03%

Table 3: Incidence of Risk Factors Related to Positive Fungal Culture

S.no		HPUD n=15		Steroid n=9		Smoking n=27		Alcohol n=17		H_2 Blocker n=12	
1.	+ve fungal culture	9	60%	5	55.55%	10	33.03%	9	52.94%	8	75%
2.	+ve candida culture	8	53.33%	4	44.44%	9	33.33%	8	47.05%	8	75%
3.	+veaspergillus culture	1	66.7%	1	11.11%	1	3.7%	1	5.88%	0	0%

Table 4: Severity Score, Systemic Disease & their Relation with Fungal Outcome

S.no		MPI score	APACHE II Score	Systemic Disease n=53	
1.	Total Avg	22.26	13	18	33.96%
2.	+Ve Fungal culture	28.08	15	13	72.23%
3.	+Ve Candida	28.86	15	13	72.23%
4.	+ VeAspergillus	26	10	0	0%
5.	None	17.44	9	5	27.77%

Table 5: Wound Infection& Mortality

S.No		Total Pts N=53		Fungal +Ve cases N=24		Candida +Ve cases N=22		Aspergillus +Ve cases N=2		None N=29	
1.	Wound Infection	30	56.6%	21	87.5%	19	86.36%	2	100%	9	31.03%
2.	Death	5	9.43%	4	16.67%	4	16.67%	0	0%	-	-

DISCUSSION

The management of peritonitis continues to have high morbidity and mortality inspite of improved surgical techniques and antibiotics [11]. The incidence of postoperative fungal infection is increasing and the gastrointestinal tract is the major source, but antifungal therapy in perforated peptic ulcer (PPU) is still controversial.

The present study has main goal to obtain an overview of frequency and significance of recovery of yeast from intra abdominal specimens after an intra abdominal perforations.In our study the incidence of gastrointestinal related fungal peritonitis came out to be 45.2% i.e 24 out 53 cases of perforated peptic ulcers were found positive for peritoneal fluid fungal culture. Amongst this 22 cultures showed candida (41.5%) as the isolated species and rest of the two were positive for aspergillus species (3.7%). These results are in concordance with the study of Koness RJ, cutitar M, Burchard KW, who had also reported positive peritoneal cultures in 52% of the patients with the most common organisms streptococii and fungi.[6]

The highest incidence of perforated peptic ulcers is found in 30-49 years of age group (39.6%) followed by age group of more than 50 years of age (37.7%), the mean age of peptic ulcer perforation is 43.32 years. But the incidence of positive peritoneal fluid fungal culture is found out to be highest in age group >50yrs (45.83%) followed by 30-49 years age group (37.5%) and least in 10-29 years age group i.e. 16.67%. As in the study by Y.S. Shan and J.C.Lee (1997-2001) [5] and by Elliot and Frank and Alden 1984-87 age >60 years is an independent risk factors for fungal peritonitis and is significantly related to a positive intraperitoneal fungal culture.

Risk factors were also evaluated for the disease progress and outcome. In our study about 50%of the patients were smokers out which 37% had positive fungal culture.It has conclusively been

shown that smoking delays healing and promotes recurrent peptic ulcers , which increases risk of fungal colonization. Both alcohol and smoking are associated with compromised host defenses and hence with high incidence of fungal culture.

The result of research by department of gastroenterology of Collagium' Medicum, Polland showed that fungal colonization of gastric ulcers impairsthe course of ulcer healing. Moreover, it results in clinical symptoms maintenance as compared with ulcers with non significant fungal cell count. Goenka, Mahesh K.,kochhar [(7)] found out in the study on 80 patients with duodenal ulcers for mycotic infections before and after 6 weeks of acid –reducing therapy that it is associated with significantly increased fungal growth. According to the study by Zwolinska-Wcislo M et al [(8)] on fungal colonization of the stomach and its clinical relevance. The studies revealed the high concentration of fungi in 54.2% patients with peptic ulcers.In our study 9 of 24 patients with fungal peritonitis had history of peptic ulcer disease (37.5%) at out of which had history of taking h2 blockers sometime or other.

The combination of prolonged duration of symptoms, pre-operative antibiotics and preoperative organ failure creates a immune compromised host with altered endogenous flora who has increased susceptibility for fungal (candida) infections of the peritoneal cavity in the face of peptic ulcer perforation [(9,10)]. Presence of systemic diseases and malignancies result in immuno compromised host with an increased susceptibility to opportunistic infections specially fungal.

Though the mortality rate is high in fungal peritonitis patients, it was not found to be clinically significant because of small sample size and hence a larger study is required to evaluate the same.

CONCLUSION

Patients with a positive fungal culture had a higher incidence of surgical site infection, a longer hospital stay and a significantly higher mortality rate, in comparison to fungal culture negative patients and results were statistically significant. Positive peritoneal fungal culture was common and was a significant risk factor for adverse outcome in patients with a PPU. A high MPI score could be used as an indicator for prophylactic antifungal therapy. So we conclude that positive peritoneal fungal co-infection is a bad prognostic factor and a significant risk factor for adverse outcome in perforation peritonitis.

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