



NNEC Perforation: Improved Survivals with Peritoneal Drainage as Primary Management

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Abstract

In this prospective study, 18 consecutive cases of neonatal necrotizing enterocolitis (NNEC) perforation were managed in two modalities. In the first group, 5 cases were treated with surgery consisting of excision of involved bowel segment and enterostomy as primary management. None of the babies survived.

Peritoneal drainage was used in the second group of 13 cases as primary procedure. Seven infants (54%) survived without any further operative procedure. six infants (46%) died. Three of them required laparotomy because of progressive deterioration or ineffective drainage.

The result of this study is encouraging in terms of survival with simple and cost effective primary peritoneal drainage (PPD).

Keywords: *Peritoneal drainage, necrotizing enterocolitis.*

NNEC is the most prevalent emergency of GI Tract occurring in neonatal period. Any form of surgical management carried very high mortality rate all over the world. Marshal ⁽¹⁾ first presented the idea of peritoneal drain in complicated NNEC cases. Since then it has been used in infants considered too sick to withstand laparotomy. Most of the published studies on the surgical treatment of NNEC have retrospectively evaluated the role of PPD in critically ill babies. They found to their surprise that sizeable number of cases recovered without any further surgical intervention ⁽²⁾.

This prospective study of NNEC perforation was carried out to evaluate the results of aggressive use of peritoneal drainage as primary and definitive form of therapy, irrespective of gestational age, birth weight and general condition of patient.

MATERIAL AND METHODS

Between January 2013 and August 2015, 18 new born with NNEC perforation were managed at Raipur Institute of Medical Sciences, Raipur.

All the patients were in stage IIIC of Bell's clinical staging ⁽³⁾. Mean gestational age was 32 weeks (30-38 weeks). There were 14 male and 4 female babies (M: F ratio was 3.5:1). Mean birth weight was 1.5 kg (900g-3kg). Relevant investigations were done in all cases. There was no clinical evidence of associated other congenital anomalies like severe congenital heart disease in any of these babies. First five cases were treated with laparotomy, excision of bowel segment and enterostomy. In rest of the cases peritoneal drainage was opted as a primary procedure.

PROCEDURE

With all aseptic precautions, bilateral flank incisions were given under local anesthesia in intensive care unit. Two penrose drains of 4 cm length were inserted and then the babies were managed with supportive care. Broad spectrum antibiotics were given till the drain was in situ, usually for 7-10 days.

In the post drainage period, infants were closely monitored for general condition, nasogastric aspirate, and peritoneal drainage and blood gas parameters. The blood and peritoneal drain cultures were obtained. Laparotomy was considered when the patient showed signs of progressive deterioration as persistent abdominal distension in the form of abdominal wall erythema or edema or copious fecal discharge from drain site. Otherwise drain was gradually removed and

oral fluids were started gradually 7-10 days after the admission.

RESULTS

The results were analyzed in terms of survival and their clinical course (Table.1). None of the patients in whom laparotomy was done as primary management survived, while in the PPD group of 13 patients, 7 (54%) survived without any further surgical treatment. Three patients (23%) showed signs of progressive deterioration and required laparotomy. Excision of gangrene segment and enterostomy was done usually within 24-48 hours of peritoneal drainage. None of them survived another 3 patients (23%) had rapid downhill septic course. Laparotomy could not be done and all died within 24 hours of PPD.

Table 1 – Showing Management Modalities with Results

Group	No of cases	PPD	Laparotomy	Survival
1	5	-	+	0
2	13	+	±	7 (54%)
A*	3 (23%)	+	-	0
B**	3 (23%)	+	+	0
C***	7 (54%)	+	-	7 (54%)

*Rapid downhill course **PPD + Laparotomy *** PPD only

DISCUSSION

NNEC is a dynamic evolving process with some areas healing with fibrosis while others are subjected simultaneously to causative factors leading to further coagulation necrosis and inflammation which is evident often in laparotomy. Operative stress and peri-operative hemodynamic instability in a compromised patient further aggravating the disease process could explain the high level mortality (100% in present series) of primary surgical management. The size of this group in this study is admittedly very small and results may not be totally representative of effectively of the mode of therapy. Nonetheless, high mortality is evident in this group.

All the 13 cases of PPD group fell into either of the three distinct groups fell into any of the three distinct groups.

- PPD, rapid downhill septic course and death within a few hours (non-salvageable group)
- PPD, deterioration, laparotomy and death in all (potentially salvageable group).
- PPD, improvement without any further surgical intervention.

About one-fourth of our patients represent non-salvageable cases of NNEC perforation as the reported overall survival by any means of surgical treatment is no more than 70-80% ⁽⁴⁾. This is because extensive bowel involvement with severe sepsis resulted in rapid downhill course. Even if laparotomy had been performed as primary management in such cases, the survival would have been doubtful.

PPD supplements the resuscitation of critically ill infants and extravasted stool from the peritoneal cavity. In addition, the abdomen is decompressed allowing more effective ventilation. There were 7 cases (54%) who required no further surgical corroborated by others ^(2,5).

If there is no response to drainage within 24 hours, operation is recommended ⁽⁵⁾. In our series, there were 3 (23%) such patients who underwent laparotomy and bowel resection but none survived. Al though failure to respond to PPD usually suggests extensive intestinal necrosis with progressive disease process, laparotomy should be undertaken if possible, since some patients can be salvaged. It is hard to prove that delay of 24 hours would have resulted in extensive necrosis as one of our patients needed re-exploration due to progressive involvement of bowel with gangrenous process.

It must be stated that the ideal and accepted way to treat a bowel perforation is by laparotomy, resection of the diseased intestine with anastomosis or stoma formation and peritoneal toilet ⁽²⁾. However given the very sick, premature, septicemic and hypoxic small babies, there is a definite role of PPD in NNEC perforation in our set up as it avoids major surgical intervention in majority of cases in acute stage and helps in stabilizing the patient for further surgical intervention in rest of the cases.

Our study has demonstrated that a simple PPD in babies with NNEC perforation and resuscitation may save more of then (54% survival) than aggressive surgery at the time of admission (nil survival).

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