(International Print/Online Journal)

SJIF IMPACT FACTOR: 5.565
PUBMED-National Library of Medicine ID-101739732

ISSN (Print): 2209-2870
ISSN (Online): 2209-2862

International Journal of Medical Science and Current Research (IJMSCR)
Available online at: www.ijmscr.com
Volume 4, Issue 6, Page No: 1470-1473
November-December 2021

IJMSCR

Post Necrotizing Enterocolitis Intestinal Stricture- Critical Appraisal of a Case Report

[1]Dr. Sunita Singh, [2]Rohit Meshram, [3]Niraj Srivastava, [4]Nitin Borkar
MS, [1]MCh, Associate Professor, [2]Senior Resident, [3]Associate Professor, [4]Additional Professor,
[1,3,4]Department of Pediatric Surgery, [3]Department of General Surgery,
[1,3,4]All India Institute of Medical Sciences, Raebareli. Utter Pradesh 229405
[2]Lady Harding < Medical College, New Delhi 110001

***Corresponding Author:**
Dr. Sunita Singh
Associate Professor, Department of Pediatric Surgery, All India Institute of Medical Sciences, Raebareli.
Uttar Pradesh 229405

Type of Publication: Case Report
Conflicts of Interest: Nil

Abstract

Necrotizing enterocolitis (NEC) is an inflammatory disease process of the gastrointestinal tract commonly affecting premature (< 37 weeks) infants. The NEC mortality rate has been decreased from 50% to 20 %. The sequel of post-NEC complications viz strictures can be isolated or multiple. These strictures can be managed via excision and primary anastomosis. The other approach is staged repair: excision of strictured segment with proximal diversion stoma, loopogram with or without contrast enema, followed by delayed closure of stoma. The author discussed a case of Post-NEC stricture relevant review of literature

Keywords: Necrotizing enterocolitis, post-NEC complications, post-NEC stricture Predictive factors for stricture, Recurrent post-NEC strictures, recurrent NEC

Introduction

Necrotizing enterocolitis (NEC) is an inflammatory disease process of the gastrointestinal tract commonly seen in the neonatal intensive care unit affecting mostly premature (< 37 weeks) infants (1). The mainstay of management is medical intervention consists of abdominal decompression, bowel rest, intravenous antibiotics and parenteral nutrition. Emergency surgery is required in infants with intestinal perforation, severe NEC or failure of medical management (2)(3).

With the advance medical management of NEC mortality rate has been decreased from 50% to 20 %(4) (5). The mortality of patients who need any kind of surgical interventions varies from 31 % to 67%(4)(2).

The sequel of post-NEC complications viz strictures increased from 5% to 35% (6). These strictures might be isolated or multiple. Isolated Post-NEC strictures occurs in 75% of cases(7) (8). The multiple Post NEC strictures might present simultaneously or after some time in sequence. The author critically appraised a case of recurrent post-NEC stricture with discussion on the existing literature.

Case Discussion:

A preterm (36 weeks Gestational age), normal vaginal delivered, female, having birth weight 2.2 Kg, presented with abdominal distension and bilious vomiting on 14th day of life. The baby was managed at peripheral hospital. The diagnosis of late-onset Modified Bell's stage II-B NEC was made (figure 1) Table 1. Hospital Record analysis revealed that baby was managed on intravenous antibiotics covering Gram positive, gram negative and anaerobe coverage. Ionotropes and/or mechanical ventillation were not required during first index admission. Blood investigations showed baby was sickle-cell trait positive. The baby improved on conservative management and discharged at 30thth day of life.

At 40th day of life baby presented to our hospital with clinical features of intestinal obstruction failing on conservative measures. The baby had grade IV of Indian Association of padiatric classification (IAP) malnutrition, with hypoalbuminia, electrolyte imbalance (hyperkalemia) . Water-soluble Contrast enema showed narrowing at sigmoid colon, which was confused by author as with Hirschsprung's disease (figure 2).

Laparotomy was performed under general anesthesia where intraoperative stricture of 1 cm was identified at recto-sigmoid junction. The strictured sigmoid colon was excised and double barrel sigmoid colostomy done.

Postoperatively 15 days were uneventful, but I week after patient again developed features of intestinal obstruction. The baby was not responding on the colonic washes. The histology of excised colonic stricture specimen showing adequate ganglionic cells, with nonspecific inflammatory infiltrates.

The baby underwent second exploratory laparotomy on 65th day of life. The author found new stricture at ascending colon just distal to ileo-cecal junction. The baby was hemodynamically unstable. So, diverting loop ileostomy was made (figure 3). The Patient developed wound dehiscence needing abdominal closure under general anesthesia. The baby discharged on 75th day of life with loop ileostomy in situ.

In follow up in outdoor department the baby developed prolapsed of loop ileostomy. The baby was gradually put on high protein diet with vitamins supplementation. At 3 month of age baby had weight of 4 Kg. The retrograde colostogram demonstrated stricture at ascending colon just distal to caecum. The fourth surgery was done under general anesthesia via excision of structured ascending colon with Ileo-transverse anastomosis with sigmoid colostomy reversal.

Results:

Histology of excised ascending colonic stricture showed nonspecific inflammation with adequate ganglion cells. She is healthy, thriving well in 3 yr of Follow up. There is no adhesive intestinal obstruction or more stricture. The neurodevelopmental and sensory development of the child is normal till date.

Discussion:

The cause of mortality in acute NEC is extensive bowel involvement, NEC related sepsis and multiple organ failure syndrome(9)(10). The delayed causes of mortality are late Intestinal failure, a chronic condition characterised by a reduction in functional intestinal mass required for adequate digestion and absorption of nutrients, fluids and growth requirements. Intestinal failure might be due to short bowel syndrome after surgery or other congenital conditions that reduce the mucosal surface area. Other delayed cause of morality is intestinal failure associated Liver disease after receiving parenteral nutrition for more than 100 days in 85% of NEC cases.(4)

Post-NEC strictures are delayed consequences of NEC. Extensive online search on Medline with key words post-NEC stricture, Predictive factors, recurrent strictures, recurrent NEC helped in Critical appraised for the case as follows.

Post-NEC strictures occur due to healing process that follows ischemic injury to the inner muscular layer of intestine(11). It is suspected if baby develops food intolerance, recurrent abdominal distension, and high gastric aspirates. The most common site for post-NEC stricture is colon and distal ileum (75%)(9). Post-NEC strictures manifests at 5th-7th wks or up to 13th wks after the acute episode of NEC(9). They develop irrespective of primary management strategies (medical and/ or surgical) of acute episode of NEC(12)(13).

The radiological features of intestinal obstruction on water soluble contrast enema confirm the diagnosis and location of post-NEC stricture. If the Contrast enema is normal, an upper gastrointestinal study with small bowel follow through is recommended to identify the stricture(14). In our case contrast enema was mimicking with transition zone of hirschsprung's disease. On exploratory laparotomy author found the rectosigmoid stricture with normal gangiopn cells in excised specimen.

Development of stricture is difficult to predict following acute NEC. However late onset NEC (> 14 days) and increased plateletcrit, leucocytosis and C-Reactive Protein might be associated with increased risk of NEC-strictures(9)(10). Except

Volume 4, Issue 6; November-December 2021; Page No 1470-1473

leucocytosis and late onset NEC our case didn't have other risk factor for development of post-NEC stricture.

The most common etiology of Post-NEC strictures is chronic progressive inflammation at multiple sites in the bowel(9)(15). The surgeons must be aware that it might also happened if inadequate resection of necrotic tissue done during primary surgical management a case of NEC(9)(15).

in 1970s and 1980s stoma formation was the preferred initial step in the management of the Post-NEC stricture alongside primary anastomosis(9). Post- NEC strictures were excised with proximal diversion colostomy, in view of development of new ongoing stricture as inflammatory process persist in the bowel maximum upto 3 month of age child, as happened in our case(15). Further most of the time post-NEC stricture are in sepsis and malnutrition, so primary anastomosis is warranted . Contrarily many case series showed primary anastomosis gave good and promising results with decrease in morbidity elated to stoma and bowel disparity in Post- NEC strictures(15). There is very low risk of recurrent or new Post-NEC stricture. The primary anastomosis is avoided in circumstances of gross discrepancy between bowel ends. To the best of authors search literature role of stricturoplasty in post-NEC stricture is not described.

Other long term complications of NEC are deafness, developmental delay, multiple food allergies, recurrent gastrointestinal clangs from short gut syndrome is under evaluation of child in close follow up(16).

Conclusions

Adequate excision of Post NEC stricture segment with stoma can be a safe option. The loopogram is must before stoma closure, because NEC is a progressive inflammation of entire Gastrointestinal tract, and possibility of further stricture or missed stricture is always there. Further, RCT/prospective study comparing different approach to surgical option in cases of Post-NEC stricture is needed to confirm the impact of Specific strategy.

Take away Message

Adequate excision of Post NEC stricture segment with primary anastomosis of bowel can be a safe option. However, eagle eyes should be kept on the possibility of appearance of new stricture .

Even in cases of diverting soma distal colostogram is must before stoma reversal to rule out undiagnosed stricture that may appear after diversion surgery of primary stricture

References:

1. Liu W, Wang Y, Zhu J, Zhang C, Liu G, Wang X, et al. Clinical features and management of post-necrotizing enterocolitis strictures in infants: A multicentre retrospective study. Medicine (Baltimore). 2020 May 1;99(19):e20209.
2. Patel RM, Ferguson J, McElroy SJ, Khashu M, Caplan MS. Defining necrotizing enterocolitis: current difficulties and future opportunities. Pediatr Res. 2020 Aug;88(Suppl 1):10–5.
3. Robinson JR, Rellinger EJ, Hatch LD, Weitkamp JH, Speck KE, Danko M, et al. Surgical necrotizing enterocolitis. Semin Perinatol [Internet]. 2017 Feb 1 [cited 2021 Dec 9];41(1):70. Available from: /pmc/articles/PMC5777619/
4. Fredriksson F, Engstrand Lilja H. Survival rates for surgically treated necrotising enterocolitis have improved over the last four decades. Acta Paediatr [Internet]. 2019 [cited 2021 Dec 9];108(9):1603. Available from: /pmc/articles/PMC6767135/
5. Geng Q, Wang Y, Li L, Guo C. Early postoperative outcomes of surgery for intestinal perforation in NEC based on intestinal location of disease. Med (United States). 2018 Sep 1;97(39).
6. Liu W, Wang Y, Zhu J, Zhang C, Liu G, Wang X, et al. Clinical features and management of post-necrotizing enterocolitis strictures in infants: A multicentre retrospective study. Medicine (Baltimore) [Internet]. 2020 May 1 [cited 2021 Dec 9];99(19):e20209. Available from: https://pubmed.ncbi.nlm.nih.gov/32384517/
7. Janik JS, Ein SH, Mancer K. Intestinal stricture after necrotizing enterocolitis. J Pediatr Surg. 1981 Aug;16(4):438–43.

Volume 4, Issue 6; November-December 2021; Page No 1470-1473

8. Geng Q, Wang Y, Li L, Guo C. Early postoperative outcomes of surgery for intestinal perforation in NEC based on intestinal location of disease. Med (United States) [Internet]. 2018 Sep 1 [cited 2021 Dec 9];97(39). Available from: https://journals.lww.com/md-journal/Fulltext/2018/09280/Early_postoperative_outcomes_of_surgery_for.15.aspx
9. Phad N, Trivedi A, Todd D, Lakkundi A. Intestinal strictures post-necrotising enterocolitis: clinical profile and risk factors. J neonatal Surg. 2014;3(4):44.
10. Gaudin A, Farnoux C, Bonnard A, Alison M, Maury L, Biran V, et al. Necrotizing Enterocolitis (NEC) and the Risk of Intestinal Stricture: The Value of C-Reactive Protein. PLoS One. 2013 Oct 11;8(10).
11. Virjee JP, Gill GJ, Desa D, Somers S, Stevenson GW. Strictures and other late complications of neonatal necrotising enterocolitis. Clin Radiol. 1979;30(1):25–31.
12. Alex Haller J, Signer RD, Golladay ES, Shaker IJ, White JJ. Intestinal stricture in necrotizing enterocolitis. J Pediatr Surg [Internet]. 1976 [cited 2021 Dec 10];11(3):381–90. Available from: https://pubmed.ncbi.nlm.nih.gov/957055/
13. Hartman GE, Drugas GT, Shochat SJ. Post-necrotizing enterocolitis strictures presenting with sepsis or perforation: Risk of clinical observation. J Pediatr Surg. 1988;23(6):562–6.
14. Burnand KM, Zaparackaite I, Lahiri RP, Parsons G, Farrugia MK, Clarke SA, et al. The value of contrast studies in the evaluation of bowel strictures after necrotising enterocolitis. Pediatr Surg Int. 2016 May 1;32(5):465–70.
15. Houben CH, Chan KWE, Mou JWC, Tam YH, Lee KH. Management of Intestinal Strictures Post Conservative Treatment of Necrotizing Enterocolitis: The Long Term Outcome. J neonatal Surg [Internet]. 2016 Jul 1 [cited 2021 Dec 10];5(3):28. Available from: http://www.ncbi.nlm.nih.gov/pubmed/27458569
16. Federici S, De Biagi L. Long Term Outcome of Infants with NEC. Curr Pediatr Rev [Internet]. 2019 Nov 30 [cited 2021 Dec 9];15(2):111–4. Available from: https://pubmed.ncbi.nlm.nih.gov/30499415/

Volume 4, Issue 6; November-December 2021; Page No 1470-1473