CASE REPORT

IMPROVISED ENTEROCUTANEOUS FISTULA DRAINAGE SYSTEM IN A CHILD WITH TYPHOID PERFORATION

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ABSTRACT

Background: About 80% of enterocutaneous fistulas (ECF) occur as a complication of abdominal surgery, while 24% of operated patients with typhoid perforation and 90% of non operated ones die. Uneven skin surface around ECFs do not allow pouch adherence and adhesive routinely slip due to sweat in our hot tropical climates. Frequent gauze dressing with adhesives, in high output fistula contributes to jeopardy of skin integration. **Objective:** A resort in managing a high output ECF from typhoid perforation in a seven year old girl with skin maceration, using improvised fistula drainage system for protective skin care, odour control and cost containment. **Method:** A simple balloon-coned fistula drainage system using a balloon and a soft conical cap found in some intravenous fluid non-collapsible container is used. It attaches well to uneven fistula stoma. **Results:** The device prevented fistula effluent leakage and further skin breakdown while enhancing healing of surrounding skin. It greatly minimizes odour and easy drainage estimation. **Conclusion:** The improvised drainage system is cost effective in containing skin maceration and healing of surrounding skin and ECF, resulting from closure of typhoid perforations. It apposed well to fistula stoma, diminishes odour but channelled meagre resources to nutrition and medication.

Keywords: Balloon drainage device, high output, Enterocutaneous fistula, typhoid perforation, limited resources

INTRODUCTION

Surgical closure of typhoid perforation is a reported cause of enterocutaneous fistula (ECF). Unlike other causes of ECF, in typhoid, at the time of surgery, the intestine is at varying stages of affectation and some impending perforations may not be appreciated, appearing later as new perforations with resultant ECFs, while variation exist in the incidence of ileal perforation ranging 0.5% - 33.6%, and reasons are as wide as its incidence.[1] These range from virulence of salmonella strain in the locality, host immune status, pattern of referral, delay in presentation, diagnosis and treatment. [1&2] Unfortunately, typhoid disease affect the poor, with poor socioeconomic condition such as inadequate sewage disposal and poor drinking water supply in these countries. [2]

I report the balloon-coned fistula drainage system devised out of limited resources in the course of managing a patient with ECF from typhoid perforation closure. It is affordable and simple but helped care for the skin and ECF drainage in added extreme situation, using locally available materials that

channelled the meagre resources towards nutrition and medication. Cheaper supplements were also used that includes dates (fruits) for potassium and honey for dressing.

CASE REPORT

A seven year old girl, referred with peritonitis secondary to typhoid perforation dating 12 days, had preoperative evaluation that revealed a low packed cell volume (PCV) 26%, (Potassium) K^+ of 2 .2 mmol/1 while urinalysis was normal. Electrolytes, urea, creatinine and liver function test were not measured regularly during the course of management due to lack of funds. She was resuscitated with intravenous fluids (IVF), had blood transfusion and antibiotics. laparatomy was done with operative findings of massive faecal intra-abdominal soilage and a perforation at the anti-mesenteric border of the ileum approximately 18cm from the ileocaecal junction, and measuring 1.5 x2.0 cm. IVF, analgesics, parenteral amoxyl with metronidazole was continued post operatively, with some oedema and slight discharge noticed at suprapubic incision site by the 4th post operative day, however trophic feeding was initiated. She developed enterocutaneous fistula with profuse drainage from the sixth day requiring changing of dressing over 8 times per day with no reliable effluent estimates [Fig 1] and had a redo surgery for closure of an old and discovery of a new perforation after 11 days. A subsequent exploration revealed adhesion, abscess and complete breakdown of the larger repair that almost transected the bowel circumference. A resection and end to end anastomosis was done but 5 days later, another ECF formed and with conservative management, skin maceration ensued [Fig1&2].

The plan was to protect the skin with improvised balloon drainage device using a soft conical plastic that comes as a cap in some intravenous fluid, under local anaesthesia (Xylocaine with adrenaline) and 15 mg of pentazocin [with Items costing $2 (N340)]. Informed consent was obtained and intervention is in compliance with Helsinki's declaration for unproven interaction in clinical practice during the course of patient management.[3]

Using a soft semi-transparent plastic cone, the apex is perforated [Fig3]. The base was sutured with nylon and 5 suture blocks made as a tight anchor at 2, 5, 6, 9 & 11 O'clock [Fig3].Each block had 2 points, an entry and exit to the base of the cone less than 1cm apart. The anchoring followed a pattern of the dehisced wound with its uneven surface and was adhered enough to avoid leakage of fluidly effluent while avoiding any risk of pressure necrosis. Suture end were knotted about 1cm away from the base of the cone through part of abdominal muscle and skin to make a little puckering against egress of fluidly effluent. Bleeding was negligible.

A huge balloon [Fig 4]was used as a collecting device in favour of a plastic bag as it grasp the cone tightly against leakage, remains well placed when patient turns sideways on bed with less risk of easy puncture. The effluents were objectively measured for the first time in the care of the patient at 580mls, 760mls and 712mls respectively in the first 72 hrs and soilage eliminated. The balloon was emptied prior to patient ambulation to minimize sagging from content weight.

Fig. 1 **Frequent fistula effluent with skin maceration**

Fig. 2 **Skin cleaned with antiseptic and sudden fistula egress**

Fig.3 **Block suture anchored to the anterior abdominal wall**

Fig.4 **Balloon was favoured, it could be emptied & reapplied**

DISCUSSION

ECF is found to occur post operatively in 80%[4] of cases while others report as high as 82%.[5] Initial surgical intervention, when indicated, should be reserved for intraabdominal abscesses, haemorrhage and fistula that fail to heal conservatively.[5,6] Conservative management has long hospital stay, massive expense on wound and drainage care, with the costs of investigations and parenteral nutrition too. Hoedema[4] reported that a critically ill patient with ECF will expend approximately $10,000 per day on care of the fistula, labour, productive time, material and products. This is not attainable for poor patients in developing nations.

Curtailing sepsis and nutrition is arbiter to success but munches resources at the expense of skin care and drainage. Commercial ostomy bags are neither cheap nor readily available in our community. In a 2011 report at the European society for medical oncology conference in Barcelona, 25% of patients at an outpatient clinic for stoma use non commercial collectible systems.[7] Most of the non commercial appliances were ingenious and effective[using homemade or reusable element or cheap available plastic bags].The study showed no statistical significance in skin infection, but skin excoriation was commoner in non commercial system with incidence of other complications and dermatitis around stomas put at about 15 – 43 %.[7]

Typhoid fever was estimated at 12 million cases annually and case fatality rate in Nigeria ranged from 10 – 24%.[8,9]The case in view, with abdominal distension and ongoing sepsis for about 12 days, will leave most surgeons with no doubt, that the abdomen shall see light, as 90% of non operated case and 24% of operated patients with typhoid perforation die.[1]The decision for a community or district doctor is to refer. This is not due to inability to manage, but simply because they are unable to take the risk when probability of complications are high. This reaffirm that Surgery, following resuscitation, remains the mainstay of treating typhoid perforation.[2]

ECF is a distressing complication to the surgeon, patient and relatives.[10] Wound care management of ECF is one of the greatest challenges in surgical patients.[4] Peculiarity of typhoid fever is that even at the time of surgery, some part of the intestine can be at different stages in the development of the disease [incubation, active invasion, fastigium, lyses and convalescence].[10] Thus, re-perforation is a documented findings and one was reported in this patient. Spontaneous closure is unlikely in high output fistula (>500mls/24 hrs) as well as disruption of intestinal continuity >50% of the circumference of the fistulous bowel, while the solution to successful management of intestinal fistula is infection control and curtailing malnutrition.[4 &11] This patient has similar findings to Obahaka's [6] 5th case, with complete transection of the ileum, as he pleas to haste slowly, but the other 4 cases responded conservatively; all of them adults with varying underlying pathology. The longest conservative closure was 63 days with total parenteral nutrition and a residual incisional hernia; it vindicates financial ability contrary to the financial inability in this reported case.

This will never have healed conservatively while acknowledging that healing with sepsis, malnutrition and no funds can only set a vicious cycle that is inevitable. Ajao[5] reported cases where fistulas closed between 7 and 150 days in those that survived using high calorie oral feeding and simple local care of the fistula, while mortality was 36% in the study group. This reported case healed and was discharged after 58 days of hospital stay. These are high cost, long duration of hospital stay cases, which

most primary and private doctors cannot come to terms with. This is buttressed by Schein [9] a fellow of American College of Surgeon, who shifted his practice from many years in teaching hospitals to a rural hospital in the USA as he stated ["*For those of us who practice in small communities, even one major complication may be too much for one's reputation, while complications in a big centre or town are easily "diluted". Moreover, the common perception is that mortalities after an operation in a rural hospital are because "of the inexperience surgeon or poor care", while if the patient dies in the Ivory Tower, then he dies despite "the best efforts of the excellent doctors in the great hospital."*]

The main challenge was to sort out the skin maceration from the effluent that consumes funds needed in the most priority area of treating sepsis and providing nutrition. This was achieved cheaply by the balloon- coned drainage system. Infection is the most common cause of death in ECF.[12] Hoedema[4] highlighted that the ' key component of ECF wound care are the trio of minimizing contamination, preventing further skin breakdown and healing of surrounding skin; without which a vicious cycle of skin breakdown, macerations ,leakage and failure for pouch adherence.' 'Draining device is the key to containment and improvement of skin integrity.' Of the containment devices, dressing which retains and absorbs caustic secretions is a major contributor to delayed healing in ECF with Inaccurate estimation of drainage unless constantly weighed.[4] Studies shows that restricted eating, prolonged hospitalization, severe illness and poor dietary intake cause deficiency of vitamin C which is a cofactor for synthesis of collagen, enhances angiogenesis and neutrophil function for eventual wound healing.[11&13] Using gauze dressing with protective skin barrier is effective in low output drainage of less than 200mls,but in high output fistula (in reported case) with frequent dressing, the adhesive contributes to jeopardy of skin integration.[4] Other options in treating fistula include continuous suction, irrigation of the fistula, silicon mould (to fill uneven skin surface to allow pouch adherence) and condom catheter fistula pouch.[4&5]

Honey was instilled into the fistulous tract. Mayoka honey is widely studied and found to inhibit the growth of staphylococcus in concentration diluted up to 100 folds [11&14] and concentration up to 1000 fold lower than commonly used antiseptic has shown antibacterial effect.[11&15] Besides, honey provide nutrients and promotes healthy granulation costing about $4 (N680) for over 750mls of pure honey used.

Potassium replacement (initially 1mmol/kg was added to IV fluid), but dates (dried fruit) was later used and it's cheap. Banana is advised commonly in Nigeria with a high content of potassium of >250 mg(6.25mmol/100g),[16] but dried dates contains very high content of potassium of >500 mg(12.5mmol/100g)]15] or 2.5 times of K^+ than bananas, with about 23 amino acids,[17] and with its trees grown near the community, it was well tolerated by the patient. It has high glucose (65% - 80%) content of the dried type. 3 varieties of Tunisia dates *(Deglet Nour, Allig and Kentichi*) has same levels of sugar (≈73.30-89.55g/100g), total phenolics (280.6 – 681.8mg oh GAE/100g) and fibres (7.95-18.83g/100g of dry matter).[17] Egyptian date fruit *(P .dactylifera L*) contains vitamin A, B1, B2, and Nicotinic acid. Studies have buttress hypokalaemia as a feature in typhoid perforation with findings associated with raised serum urea levels in 28.3% (13 patients) of cases reported by Nuhu et al [18] and 74% (64 cases) by Ugochukwu et al, as a prominent finding.[19]

CONCLUSION

The improvised ECF drainage device prevented leakage of fistula effluents thereby preventing further skin breakdown, was cost effective in curtailing skin maceration and promotes healing of ECF. It also minimizes odour and provide an easy objective assessment of drainage estimation that can enhance a more accurate fluid replacement therapy. Despite recommendation on resection

and anastomosis for complicated fistula, outcome will be dismal when poor nutrition and infection coexist with poverty.

Modification of the plastic cone to a flexible hub as a connector for the ECF stoma and a strong balloon with an elastic tip can be an improvement for an ECF drainage system for our environmental challenges. My advice to the mother is to resort to boiling drinking water, otherwise the vicious circle continues; this I have no doubt in her commitment, at least for longer than she had waited patiently for God to reward her of the only child after near decade of marriage.

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ERRATUM

A mistake was made in the name of the third author in the article entitled "FOCUSED ANTENATAL CARE ACCEPTANCE IN NORTHEASTERN REGION OF NIGERIA: CLIENTS' PERSPECTIVE" in Vol. 7, 2013. In Kanem Journal of Medical Sciences, it should read:
"FOCUSED ANTENATAL CARE ACCEPTANCE IN NORTHEASTERN REGION OF NIGERIA: CLIENTS' PERSPECTIVE"
[1]Bolori MT, [2]Bukar M, [2]Ibrahim SM, [1]Amodu M, [1]Shuaibu Y, [3]Ibrahim M, [4]Meleh S, [5]Bashir B.

The error is highly regretted.
Editor