

 <p>ISSN NO. 2320-5407</p>	<p>Journal Homepage: - www.journalijar.com</p> <p>INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)</p> <p>Article DOI: 10.21474/IJAR01/2230 DOI URL: http://dx.doi.org/10.21474/IJAR01/2230</p>	 <p>INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR) ISSN 2320-5407</p> <p>Journal homepage: http://www.journalijar.com Journal DOI: 10.21474/IJAR01</p>
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RESEARCH ARTICLE

TO STUDY THE EPIDEMIOLOGY AND MANAGEMENT OF FECAL FISTULA

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Manuscript Info

Manuscript History

Received: 28 September 2016
Final Accepted: 30 October 2016
Published: November 2016

Key words:-

fecal, fistula, morbidity, urinary.

Abstract

Aims and objectives:- to study the epidemiology of fecal fistula

Material and methods:- inclusion criteria:- all patients developing fecal fistula after abdominal surgery. Exclusion criteria:- pharyngeal, oesophageal, anorectal and urinary fistulas are excluded from the study. Results and conclusion:- in the end it was concluded that fecal fistula is a post operative complication with significant morbidity in relation to patient on one side and a lot of dedicated effort in limiting the morbidity on other side is required by the doctor with utmost care of the patient with fecal fistula.

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Introduction:-

Wounds and their management are fundamental to the practice of surgery, as any kind of surgical intervention will result in a wound. Post operative wound complication is common, but sometimes a difficult event is experienced by a surgeon. A similar situation is a faecal fistula.

Fistula is defined as an abnormal communication between two epithelialised surfaces. A Enterocutaneous fistula also known as faecal fistula is referred to as a communication between the gut and the skin.

Enterocutaneous (faecal) fistula is a very serious post operative complication, associated with significant morbidity and mortality. It directly affects the patient - by increasing the risk of morbidity and mortality, the attendants - by increasing the cost of treatment and consuming their precious time, the surgeon - for whom it is a disturbing event and the Hospital - by increasing the health care cost due to prolonged hospital stay.

Enterocutaneous fistulas may be classified as spontaneous or postoperative. Spontaneous fistulas are due to intestinal diseases like radiation enteritis, tuberculosis, actinomycosis, amoebiasis, Crohn's disease, diverticular disease and malignancy. Crohn's disease represents the commonest form and approximately 30- 40% of this group eventually develop fistula. Post operative fistulas are due to leaking of intestinal anastomosis or unrecognised injury to the bowel at laparotomy. These are further classified as simple (single tract) or complex (large communicating abscesses between bowel and skin or have multiple tracts).

The pathophysiology of fistulae can be evaluated through various techniques, including the Dye study i.e. Fistulography, Computed Tomography Scan, Ultrasonography, Magnetic Resonance Imaging and Endoscopy etc.

Gastrointestinal secretions approximately amount to 8 to 10 litres/day. Fistulous effluent is rich in sodium, potassium, chloride and bicarbonates. Their losses depend upon the anastomotic location of the fistula.

The complexity of an enterocutaneous fistula depends on the volume and nature of the output. Low-volume output is <200 ml/24 hours, moderate output is 200 to 500 ml/24 hours and high output is >500 ml/24 hours. Approximately 30% of all types of fistulae close spontaneously within 6-7 weeks.

Gastrointestinal Fistulas (GIF) are often difficult to manage and are associated with increased morbidity and mortality, often requiring longer hospital stay. Fistulas can often arise following abdominal surgery or trauma. In general, the more proximal a fistula, the greater is the fistula output volume. High output fistulas are more likely to cause complications such as malnutrition, sepsis, fluid and electrolyte disturbances and have a lower incidence of spontaneous closure. With medical management alone there is a potential for spontaneous fistula closure, however this may take several weeks. Fistulas refractory to medical management generally require surgical closure.

Octreotide - an analogue of Somatostatin, which can reduce gastrointestinal, biliary and pancreatic secretions as well as decrease gastrointestinal motility is being used. Somatostatin is secreted within the pancreas, stomach, intestinal mucosa and mesenteric neurons. Because of its inhibitory actions, Somatostatin has been used in the management of Upper Gastrointestinal haemorrhage, Secretory diarrhoeas and Peptide secreting tumours. Octreotide has a longer half-life than Somatostatin which allows for intermittent and subcutaneous injections rather than a continuous intravenous infusion. Treatment with Octreotide is proposed to decrease nutrient and electrolyte losses and promote fistula closure. Benefits of these actions would include decreased hospital stay, decreased complication rates and decreased overall cost of treatment.

Approximately 85% to 90% of GIF arise following surgical procedures. Gynaecological patients appear to be at an increased risk of GIF (up to 30%). There are multiple reasons that account for the poor prognosis associated with GIF. These factors include:

- (a) Underlying chronic diseases like TB, malignancy, IBD, etc.
- (b) Difficulty in maintaining adequate nutritional status.
- (c) Frequent presence of sepsis.
- (d) Cost factor/socio-economic status of patient.
- (e) Associated severe fluid and electrolyte disturbances.
- (f) Complex and difficult management of the wounds.

(S. P. Stawicki, MD 1, Benjamin M. Braslow, MD 2008)

Material and method:-

The present study was conducted in the Department of Surgery, GMC, Jammu w-e-f 1-11-2014 to 31-10-2015. Patients admitted in various surgical units of the department were incorporated in study design. Presenting features and detailed history of the disease was recorded as per enclosed proforma.

Inclusion criteria:-

- 1) All patients developing faecal fistula following open/laparoscopic abdominal surgery both elective and emergency cases including Gynaecological/vascular/thoracoabdominal/urological surgeries.
- 2) All patients irrespective of demographic profile.
- 3) All patients irrespective of type/duration of surgery & type of anesthesia.

Exclusion criteria:-

Pharyngeal, oesophageal, anorectal and urinary fistulas were excluded from the study.

General condition, age, weight, sex of the patient was noted. The type of surgery, duration between surgery and development of faecal fistula, number of fistulous openings, their size, type and nature of fistulous discharge whether foul smelling /non foul smelling, fluid, solid or semisolid faecal matter was noted. Daily fistulous output, urine output, extent of malnutrition, daily weight loss, electrolyte imbalances, hemoglobin were recorded. Type of fistula whether small bowel fistula or large bowel fistula and their duration was considered.

Episodes of fever (its duration and intensity), jaundice, respiratory symptoms (tachypnoea, laboured breathing), cardiovascular symptoms (flushing, sweating, tachycardia, hypotension), gastrointestinal symptoms (diarrhea, constipation, vomiting) and urinary symptoms (decreased urine output, frequency) were noted. Extent of malnutrition was also noted using skin fold thickness, mid arm circumference.

Thorough general physical and systemic examination was carried out in all the patients. The patients were subjected to routine investigations including hemogram, renal function tests, liver function tests, total proteins especially albumin, serum electrolytes, urine routine examination and wound swab/blood/urine cultures. Plain abdominal and chest radiographs were taken and ultrasonography of the abdomen was done in all the cases. Specific investigations were conducted as per need :

- i) Fistulograms,
- ii) Contrast study,
- iii) Computerized tomographic scan of the abdomen.

Patients when diagnosed as case of faecal fistula were shifted to wards with trained nursing staff and resident doctor. Fluid and electrolyte imbalance was corrected. A close record of vital signs (pulse, heart rate, blood pressure, temperature, urine output, respiratory rate) was kept in every case. Correction of anemia was done with blood transfusions.

Broad spectrum antibiotics like second generation cephalosporins and metronidazole were started as per the protocol. Ryles tube was kept as and when necessary in cases of high output small bowel fistulas. Temporary ileostomy bags were applied for collection of fistulous discharge. Daily antiseptic dressings were done, along with application of zinc oxide powder/lotion to the peristomal skin.

Short course of parenteral nutrition via peripheral vein was given to seven patients of colocutaneous fistulas. Long term parenteral nutrition was given to the twenty five patients of small bowel fistulas

Observations:-

The present study on " THE EPIDEMIOLOGY AND MANAGEMENT OF FAECAL FISTULAE " has been done in the Department of Surgery, Government Medical College, Jammu during the period of 01-11-2014 to 31-10-2015.

The following observations were made

Table no.1:- Age-wise distribution of patients

Age	Number of Patients	Percentage
10-20 years	2	6.25%
20-30 years	5	15.6%
30-40 years	6	18.75%
40-50 years	8	25%
50-60 years	4	12.5%
60-70 years	3	9.37%
70-80 years	3	9.37%
80-90 years	1	3.125%
Total	32	100%

In this study, the age of the patients ranged from 10 years (a case of appendicular perforation) to 85 years (a case of intestinal obstruction). Majority of the patients with faecal fistulas in our series were in the third decade of life.

Table no. 2:- sex-wise distribution of patients.

SEX	NUMBER OF PATIENTS	PERCENTAGE
Male	23	71.87%
Female	9	28.125%
Total	32	100%

The above table shows that 71.87% of patients were males and 28.125% of patients were females.

Table no. 3:- Showing types of fistulae.

S.No.	Type of Fistula	No. of Patients	Percentage
1.	Small bowel fistula	25	78.125%
2.	Large bowel fistula	7	21.875%
3.	Total	32	100%

In our series, twenty five patients presented with small bowel fistula and seven patients with large bowel fistula. All patients developed fistulas from fourth to sixth postoperative day. Onset of fistula was preceded by high grade fever, serosanguinous discharge, colicky abdominal pain, erythema around the wound and tension at the suture line of the abdominal wound. The onset of faecal discharge was preceded by purulent discharge for 1-2 days, in all patients with small bowel. However, colicky pains were not associated with large bowel fistulas. Emergence of fistulous discharge from the drain site was noticed in twenty one patients (70%).

Table no.4:- showing aetiology of small bowel fistulae.

CAUSE	NO. OF PATIENTS	PERCENTAGE
Intestinal obstruction	9	36%
Intestinal perforation	9	36%
Trauma	1	4%
Iatrogenic	6	24%
Total	25	100%

Among twenty five patients with small bowel fistula, nine patients developed fistula following surgery for intestinal obstruction, nine patients developed fistula following surgery for intestinal perforation, one patients developed fistula following closure of the traumatic perforation (penetrating trauma). In all the patients double layer interrupted absorbable sutures (vicryl 3-0) were used. Six patients developed enterocutaneous fistula because of iatrogenic injury.

Table no.5:- Setiology of large bowel fistulae.

CAUSE	NO. OF PATIENTS	PERCENTAGE
INTESTINAL OBSTRUCTION	3	42.85%
IATROGENIC	3	42.85%
APPENDICULAR PERFORATION	1	14.58%
Total	7	100%

Among seven patients with large bowel fistula, three patient develop fistula following operation for intestinal obstruction, two develop fistula after iatrogenic injury, one developed after operated for appendicular perforation.

Table no.6:- Showing average fistulous output.

S.NO.	TYPE OF FISTULA	AVERAGE FISTULOUS OUTPUT (ML/DAY)
1.	Small Bowel	391.2
2.	Large Bowel	142.87

Average fistulous output amongst seventeen patients with small bowel fistula was 391.2 ml/day, ranging from 100 ml (a case of ileal perforation) to 1050 ml (a case of intestinal obstruction). All the patients had feculant fistulous discharge..

Average fistulous output among patients with colocutaneous fistulae was 150ml/day ranging from 120 ml to 200 ml/day. All had low output faecal fistulae.

Out of thirty two patients, ten patients (31.25%) had fistulous output less than 200 ml/day, seventeen patients (53.12%) had fistulous output 200 to 500 ml/day and five (15.625%) other patients had fistulous output more than 500 ml/day.

Table no.7:- showing complications of faecal fistulae.

S.No.	COMPLICATIONS	SMALL BOWEL (n=25)	LARGE BOWEL (n=7)
1.	Malnutrition Moderate weight loss (7 to 11 Kg). Severe weight loss (more than 11 kg)	10(40%) 2(8%)	1(14.28%) Nil

2.	Electrolyte Imbalances	11(44%)	2(28.57%)
3.	Infection/Sepsis	5(20%)	1(14.28%)
4.	Pulmonary Complications	5(20%)	3(42.85%)
5.	Bleeding	Nil	Nil
6.	Excoriations	22(88%)	2(28.57%)

In our series of thirty two patients of faecal fistula, the above complications were noted. Malnutrition was present in significant number of patients of our series, although it was more prominent in patients with small bowel fistula. Electrolyte imbalances(72%), skin excoriation(88%), sepsis(20%) and pulmonary complications(20%) were more prevalent in patients with small bowel fistula. Pulmonary complications were noted in five patients of small bowel fistula. All the five patients with pulmonary complications developed severe respiratory distress, onset was sudden in two patients. Complications as malnutrition, electrolyte imbalances and skin excoriations were prominent in patients with high output fistula. Hypokalemia was prominent electrolyte imbalance noticed. Episodes of fever with rigors and chills were more evident in patients with small bowel fistula.

Table no.8:- Showing various investigations

INVESTIGATION	NUMBER OF PATIENTS	PERCENTAGE
Plain x-ray chest/ abdomen	32	100%
Ultrasonography	32	100%
Fistulogram	8	25%
Contrast study	12	37.5%
CT abdomen	22	68.75%

Various radiological investigations done in thirty two patients of our series were plain chest and abdominal X-rays, fistulogram, computerized tomography, ultrasonography. Plain x-ray showed pleural effusion in eight patients (five patients of small bowel fistula and three patients of large bowel fistula). Ultrasonography showed intra-abdominal fluid collection/intra-abdominal abscess in eleven patients. Computerized tomography was done in twenty-two patients (nineteen patients had small bowel fistulas and three patients had large bowel fistula).

Fistulogram was done in eight patients using water soluble contrast diluted with normal saline in the ratio of 1:1. Contrast was injected into the tract using Foleys catheter, whose balloon was inflated at the fistulous opening to avoid spillage of the contrast. Fistulous tract was identified in all the patients. However, the evidence of multiple tracts, intervening communications or distal obstruction was not found. Three fistulograms were taken for each patient, immediately after injection, half an hour after injection and two hours after injection to trace the extent of contrast.

All the patients of our series were shifted to beds with resident doctors and nursing staff within the wards, at the time of presentation. Good nursing care was provided to all the patients. Peripheral line was maintained in all the patients for fluid administration. Air-bed was provided to them. Catheterization was done in all patients with high output fistula. Daily losses were calculated, fluid replaced accordingly, 200-300 ml of fluid was added for every 1°C rise in temperature. Broad spectrum antibiotics preferably cephalosporins plus metronidazole were administered to the patients as and when required after obtaining the culture samples(urine/blood/catheter tip culture/wound swab). Central venous line was established in patients with high output fistula (usually above 500ml/day) and fluid replacement was done according to central venous pressure. During the initial phase of resuscitation, about four hourly record of temperature, pulse and blood pressure was kept.

Daily samples were sent for electrolyte estimation in patients with high output fistula and sampling was done every third day in cases of low output fistula. Any electrolyte imbalances were then corrected accordingly. Ryles tube was kept in patients of high output fistula if required, while patients of low output fistulas were kept nil orally for at least 2 to 3 days after the onset of fistulas, especially in the cases of colcutaneous fistula.

Somatostatin analogue, octreotide was instituted in all patients in the dose of 50- 100 micrograms 8 hourly for duration ranging from one week to one month and rapid fall in fistulous output was noted. Fresh frozen plasma and

whole blood transfusions were provided to correct falling haematocrit or hypoproteinemia. Multiple infusions were given to the severely malnourished patients to maintain hemocrit and serum albumin within normal limits.

In five patients with small bowel fistula and four patients with colonic fistula where fistula drained from the main wound, temporary ileostomy bags were attached after 3-4 days of onset of fistula. In twenty one patients where the tube drains were kept, the ileostomy bags were attached after two weeks following removal of the drain as they were the potential source of intra abdominal infection. Ileostomy bags were changed as and when necessary depending upon clinical/financial condition of patients. Antiseptic dressings were done and the skin surrounding the stoma was treated with zinc oxide powder. Wounds were irrigated frequently using normal saline and metronidazole solutions to evacuate the undrained pockets of pus and any visible faecal or mucinous collections. Patients were advised to lie in prone position to allow the dependent drainage. The healthy granulation tissue was evident in five patients of our series within seven to eight days of start of therapy.

All patients of our series received long courses of antibiotics at some stage of their hospitalization. Hemogram was done routinely in septic patients for total and differential leucocyte count. Type of antibiotics used was guided by blood culture, catheter tip culture or wound swab culture sensitivity reports. In the septic patients, repeated ultrasonography was done to detect the poorly localized and undrained pus pockets. Computerized tomography was done in twenty two patients with recurrent episodes of fever which showed intra abdominal collections in eight patients.

Ultrasound guided aspiration of the abscess was done in three patients (10%) and CT guided percutaneous aspiration using local anaesthesia under all aseptic precautions was done in two patients (6.6%). Aspirated pus was sent for culture study. Higher antibiotics (meropenem/imepenem/cilastatin) were used only in two (6.6%) patients who were having recurrent episodes of high grade fever despite administration of culture mediated antibiotics. Course of anti-malarial drugs was given to three (10%) patients as they were complaining of high grade fever with rigors, chills and sweating. Despite all measures to control sepsis, six patients (18.75%) went into septicemia, septic shock and ultimately died.

In all patients of our series, nutrition was started as early as possible, to meet metabolic demands of the hyper-catabolic state, to reduce their negative nitrogen balance and compensate for the gastro-intestinal fluid losses from their fistula. In either form of parenteral or enteral nutrition, calories provided were 3500 to 4000 K cal/day in cases of high output fistula, 3000 to 3500 K cal/day in cases of moderate output fistula and 2500 to 3000 K cal/day in cases of low output fistula. Proteins were provided 1.5gm to 2 gm/kg/day and it was increased as per need.

Serum albumin estimation was done regularly for all patients and its level was maintained above 3gm/dl.

Enteral nutrition was given to thirteen patients (43.3%). The enteral solutions provided to the patients were albumin care/HQ-pro etc. The diet solutions were administered cyclically over 24 hours. Each millilitre solution of enteral feed provided 1-2 kcal of energy and 0.6 gm of proteins. Additional requirement of fluid and calories was met through the peripheral line.

In seven patients of colocutaneous fistula, oral feed was ensured usually after third to fourth day. Diet provided to them was palatable, highly fibrous and contains rich source of calories and proteins. Cooked vegetables, fruits, cereals, milk and eggs were the main components of the diet. Peripheral line was kept patent for intravenous administration of antibiotics. However, increase in the fistulous output was noted with the start of feed with gradual decrease after one week. Elemental diet was provided to only one patient of colocutaneous fistula but results were equivalent to that were obtained by high fiber diet.

All the patients of our series were supplemented with parenteral nutrition consisting of celepid, celemin and celemix (Claris). Short course of parenteral nutrition lasting for less than ten to fourteen days was given to the patients with colocutaneous fistulas. In patients with colocutaneous fistula, protein rich high fiber diet was given. In patients with small bowel fistula parenteral nutrition was administered via central line using subclavian vein for one to two months. Weight gain and improvement in nutritional status was seen in thirteen patients with small bowel fistula (76.4%) in which spontaneous closure was noted. Seven patients of colocutaneous fistula who were provided supplementary enteral feed showed rapid signs of fistula healing. Parenteral nutrition complications recorded were peripheral vein thrombophlebitis in seven patients (23.3%), high grade fever was noted in five patients (16.6%) that

settled with change of central line catheter and administration of culture related antibiotics. Minor levels of electrolyte imbalances were frequently seen during the course of parenteral nutrition, but were effectively managed accordingly.

Among thirty two patients of our series surgical intervention was done in seven patients of small bowel fistula. Patients were sepsis free and were nutritionally supported by parenteral nutrition. Proximal loop ileostomy with creation of mucous fistula was undertaken under general anaesthesia to

dysfunction the fistulous segment. Surgery was done in patients with small bowel fistula because there was no significant decrease in fistulous output even after four weeks of parenteral nutrition. Patients were encouraged to take orally after creation of loop ileostomy. All patients did well and closure of proximal loop ileostomy was planned four to six weeks after healing of fistula and confirmation of distal gut patency by contrast studies.

Table no. 9:- Showing spontaneous closure of fistulae

Type of fistula	Number of patients	Percentage
Small bowel fistula (n=25)	13	52%
Large bowel fistula (n=7)	5	71.428%
Total (n:32)	18	56.25%

Among twenty five patients of small bowel fistula in our series, thirteen patients had spontaneous closure within 30.7 days with the range of 14 days (a case of post LSCS faecal fistula) to 70 days (a case operated for intestinal obstruction). Spontaneous closure among five patients of colocutaneous fistula occurred in an average of 23 days ranging from 12 to 38 days. Over all, spontaneous closure was noted in 78.12% (n:25) of the patients in our series.

Table no.10 :- Showing mortality rate.

S.No.	TYPE OF FISTULA	NO. OF PATIENTS DIED	MORTALITY
1.	Small bowel fistula(n=25)	5	20%
2.	Large bowel fistula(n=7)	1	14.28%
3.	Total (n=32)	6	18.75%

Among thirty two patients of enterocutaneous fistula of our study, six patients died (18.75%) which included five patients of small bowel fistula (20%) and one patient of large bowel fistula(14.28%).

Table no.11:- showing causes of mortality.

S.NO.	CAUSES OF MORTALITY	NO. OF PATIENTS DIED	PERCENTAGE
1.	Septicemia	4	12.5%
2.	Electrolyte imbalances/malnutrition	1	3.125%
3.	Pulmonary complications	1	3.125%

Among the six deaths of the patients of our series, four were due to septicemia, one patient died due to pulmonary complications. Death in one patient was linked to electrolyte imbalance and malnutrition. All patients who died had fistulous output more than 200 ml/day. Uncontrolled septicemia was the major cause of mortality (12.5%) in our series.

Discussion:-

The present study on “ THE EPIDEMIOLOGY AND MANAGEMENT OF FAECAL FISTULAE” has been conducted in the Department of Surgery, Government Medical College, Jammu during the period of 01-11-2014 to 31-10-2015.

Age and sex wise distribution of patients in our study revealed that out of thirty two patients, twenty-three were males and nine were females. Their age ranged from ten years (a female with ileocutaneous fistula) to eighty

five years(a female with intestinal obstruction). Majority of the patients were in their third and fourth decade of life. Age and sex pattern showed resemblance with the reports of various authors. **Aguirre (1974)** in his series of thirty

eight patients reported eighteen females and twenty males, with an age range of 17 to 77 years. Majority of the patients were in the fifth, sixth and seventh decade of life. Similarly, **Nemhauser and Brayton (1967)** in their series of nineteen patients reported ten women and nine men with their ages ranging from 32 to 74 years.

In our series of thirty two patients with intestinal fistulae, twenty five (71.12%) had ileocutaneous fistulae and seven (21.87%) had colcutaneous fistulae. **Mac Fadyen et al (1973)** in his series of sixty one patients reported ten (16.40%) patients with ileocutaneous fistulae and twenty four (39.34%) patients with colcutaneous fistulae. Similarly, **Bury et al (1971)** in his series of thirteen patients reported two (15.38%) patients with ileocutaneous fistulae and two (15.38%) patients with colcutaneous fistulae. **Rocchio et al (1974)** in their series of thirty seven patients reported sixteen (43.24%) patients with small bowel fistulae and nine (24.32%) patients with large bowel fistulae. In our series, however, only 21.87% were cases of colcutaneous fistulae which is far less than that reported by many authors because of decreased incidence of surgeries for inflammatory bowel disease and complex malignancy in our study.

Among twenty five patients of small bowel fistula, nine patients (36%) operated for intestinal obstruction resulted in anastomotic breakdown and fistula formation. Fistula formation in nine (36%) patients occurred following surgery for small bowel ulcer perforation, one (4%) patients had traumatic perforations, six patients had iatrogenic perforation resulting in fistula formation.

Out of the seven large bowel fistulae in our series, three patients developed fistula following surgery for intestinal obstruction, one patient developed faecal fistula following surgery for appendicular perforation, two patients reported hospital directly as recto-vaginal fistula and post hernioplasty faecal fistula and one patient developed fistula after stoma closure. **Lewis and Penick (1993)** reported 35% of colcutaneous fistulae following difficult appendectomy.

Daily fistulous output in fourteen patients with ileocutaneous fistula varied from 100ml to 1050ml with an average of 391.2ml/day. Fistulous output in four patients of colcutaneous fistula varied from 100ml to 200ml/day with an average of 142.87ml/day. **Fischer et al (1975)** in his series of eighty eight patients with gastrointestinal fistulae reported twenty eight (31.8%) patients with fistulous output more than 500ml/day and 32 patients (36.36%) patients with output of 200-500 ml/day and 28 patients with fistulous output of less than 200ml/day. However, in our series four patients (12.5%) had fistula output more than 500ml/day, eighteen patients (56.25%) had fistula output of 200 to 500 ml/day and ten patients (31.25%) had fistula output less than 200ml/day.

Malnutrition was present in all the patients of our series. Skin excoriations and electrolyte imbalances were more common in patients with proximal ileocutaneous fistulae. **Soeters et al (1979)** in their series of 110 patients with gastrointestinal fistulae reported malnourishment, electrolyte imbalances, obstruction, bleeding, excoriations and infection as the major complications.

Levy et al (1989) reported intra abdominal abscesses, septicaemia, ileus, adult respiratory distress syndrome, upper gastrointestinal tract hemorrhage, renal/hepatic failure and thromboembolic complications as complications associated with high mortality rate.

Chest x-ray, computerized tomography, ultrasonography and fistulogram, were the various radiological investigations done in thirty two patients of our series. Chest x-rays and ultrasonography was done in all the patients. Pleural effusion was found in five patients due to hypoproteinemia. USG showed intra abdominal fluid collections in five patients and interloop fluid was found in ten patients. CT Scan was not done in ten patients, intra-abdominal abscesses/collections were discovered in eleven patients by CT scan. Fistulogram was done in eight patients, which clearly delineated the tract in all patients. **Lambiase et al (1992)** advocated CT scan for all patients of gastrointestinal fistulas with sepsis in order to identify the intra-abdominal collections/abscesses. The same author reported radiological investigations as the single most important entity in defining the anatomy of the fistula, whereas **Rossi et al (1986)** in their series of 18 patients of gastrointestinal fistulae reported positive fistulograms in twelve patients, upper gastrointestinal tract series in eight patients, plain x-rays showing intra abdominal abscess in two patients, and CT scan done in three patients showed subhepatic abscess in one patient. Similarly, **Hill (1983)** reported radiological investigations to outline the anatomic site, nature and the cause for the breakdown of intestinal anastomosis. These investigations were essential if there was no decrease in fistula output. The same author reported fistulography using thin barium as the best mode of demonstrating the fistula and ascertain the cause of its

persistence. However, in difficult cases fistulography in conjunction with barium follow through evaluated the whole tract but conjunction study was not performed in any of the patients in our study. Similarly, **Metcalf (1999)** reported that fistulogram done after 7 to 10 days of occurrence of fistula assisted in the determination of the origin of the fistula, the length of the tract and the continuity with the bowel. CT scan, cystoscopy, intravenous urography and USG were often used to identify impediments to fistula closure. Thirty two patients of gastrointestinal fistulas in our series were treated by parenteral nutrition, enteral nutrition and surgical correction as shown in table.

S.No.	Type of fistula	Enteral	Parenteral	Surgery
1.	Small bowel fistula (n=25)	25	25	6
2.	Large bowel fistula (n=7)	7	7	1

Fluid and electrolyte imbalance was corrected, blood and plasma infusions were provided as and when required and antibiotics as per culture and sensitivity reports. **Shelden et al (1971)** emphasized the need to commence resuscitation immediately, since many patients were dehydrated, acidotic, presented in hypercatabolic state and septic shock. Immediate fluid and electrolyte replacement, drainage of abdominal collections/abscesses and efficient management of fistulous output was done within first 12 hours. **Todd and Saunders (1971)** used stoma adhesive sheets with orabase paste to prevent excoriations of the skin. **Shrikhande and Fischer (1999)** advocated karaya powder or ileostomy cement or ion exchange resins that keep the skin acidic and prevent activation of pancreatic enzymes. Daily output and input records were well maintained and managed. Blood gas analysis and electrolyte measurements were done every day in patients with high output fistulas and every third day for patients with low output fistulas. However, **Irvin G (1971)** reported occurrence of trace element deficiency if the fistula persisted and replacement of magnesium, zinc and cobalt was necessary. The fluid and electrolytes losses and replacement resembled with the findings of various authors. The significant electrolyte imbalances in our series were hypokalemia and hyponatremia which were replaced accordingly.

Octreotide (Somatostatin analogue) was used in all patients with high output fistula. It was given in the dose of 100 µg subcutaneously, thrice a day for at least 15 days.

Enteral nutrition was given to all patients. Twenty five patients had small bowel fistula and seven patients had colcutaneous fistula.

However, **Chapman et al (1964)** advocated feeding jejunostomy for high output fistulas within first week of the onset of fistula. Three thousand calories were given in controlled fashion each day, preventing the GIT' overload. However, **Kaminski (1976)** advocated enteral feed to be less hazardous, easy to manage with less severe complications. Elemental diet were given at the rate of 75 ml per hour providing 50 to 60 kilocalories per kg body weight with 6 hourly monitoring of urinary glucose.

In our series of thirty two patients, surgical correction was done in nine patients with small bowel fistulas. Diverting proximal loop ileostomy with mucous fistula was created in all patients, as there was no reduction in fistula output after 4 weeks of sepsis free and full nutritional support. **Shrikhande and Fischer (1999)** reported best results with the resection of the fistulous segment and end to end two layered interrupted non-absorbable sutures anastomosis, all other approaches were compromising. However, all our operated patients did well and their ileostomies were closed successfully after 8-12 weeks.

Spontaneous closure was noted in 56.25% of the patients of our series. 52% for patients with small bowel fistulas, 71.428% for large bowel fistulas was noted. Closure after surgery occurred in all the patients who had small bowel fistulas. Overall mortality, among the patients of our series was 18.75%. There was 24% mortality seen among the patients with small bowel fistulas and 14.28% mortality seen in patients with large bowel fistulas. Where as mortality noted by some authors were as shown in table:

Authors	Mortality
West et al (1961)	26%
Hollender et al (1983)	48%
Irving (1990)	10%
Hill et al (1988)	16%

Levy et al (1989)	34%
Peix et al (1982)	27%

Tarazi et al (1983) noted 29.8% mortality for patients with gastroduodenal fistulas. Whereas, **Reber et al (1978)** reported mortality of 18% for gastroduodenal fistulas.

Conclusion:-

The present study was conducted on thirty two patients with faecal fistulas of abdomen admitted in various surgical units in the Post Graduate Department of Surgery, Government Medical College, Jammu, during the period from 01-11-2014 to 31-10-2015.

- Majority of the patients in our series were in the third and fourth decade of their life(18.75%).
- Incidence of faecal fistulas was more prominent in males(71.87%).
- Majority of the patients in our series developed faecal fistulas postoperatively.
- Among these small bowel fistulas were the most common fistulas encountered (78.125%) whereas, colocutaneous fistulas were less common (21.875%).
- Fistula drained through the main wound in nine patients. Among these five patients had small bowel fistula and four patients had large bowel fistula, while in others drain site was involved in discharging the fistulous contents.
- It is concluded that surgery for intestinal obstruction and ileal perforation following enteric fever led to the majority of small bowel fistulas.
- Intestinal obstruction, drainage of appendicular abscess and appendicectomy accounted for colocutaneous fistulas, while in the remaining trauma and iatrogenic injury caused fistulas.
- Although history and clinical examination was of paramount importance in diagnosis, it is concluded that fistulogram is an excellent mode of determining the site of origin of fistula, which successfully defined the fistulous tract in eight patients. However, failure was due to incorrect techniques, associated abscesses or carrying out the procedure before one week of origin of the fistula.
- Computerized tomography scan was the best investigation for localizing the intra abdominal abscess.
- Intensive care, monitoring, resuscitation with correction of fluid/electrolyte imbalances, routine antiseptic dressings and administration broad spectrum antibiotics helped the patient to fight initial catastrophe.
- Somatostatin analogue (Octreotide 50-200 µg/day) helped decreasing the fistulous output within 48 hours of use. It thickened the secretions, which made easy collection of the fistulous discharge and thus reducing skin excoriations which allowed early spontaneous closure of the fistula.
- Application of calamine/zinc oxide lotion over the parastomal skin and collection of fistulous discharge in disposable ileostomy bags, helped to record the fistulous output and to keep the patient dry rather than soaked in the fistulous discharge, when simple dressings were kept. It is concluded that collection of fistulous discharge with ileostomy bags is better than simple dressing. Parasurgical nursing care was valuable.
- It was seen that earlier the patient was made ambulatory, faster was the recovery. Regular physiotherapy and frequent changing of posture avoided many complications.
- Most of the faecal fistulae resulted in the intestinal failure leading to a state, where they could not maintain nutrition and fluid balance of the body.
- Nutrition, whether enteral or parenteral, is of paramount importance in achieving the goal of spontaneous closure. All types of faecal fistulas show signs of rapid healing when nutritional status of the patient is improved. Over all spontaneous closure of 78.125% was recorded in our series, 52% for small bowel fistulas and 85.71% for colocutaneous fistulas with conservative methods.
- Malnutrition in twenty patients, electrolytes imbalances in twenty patients and fever in eighteen patients, were the main complications noted with fistula.
- Surgery in the form of proximal loop ileostomy and mucous fistula was undertaken in nine patients of small bowel fistula to dysfunction the fistulous segment. Closure was seen in all the patients with in four weeks of loop ileostomy. It is concluded that surgical intervention done in patients who are sepsis free with full nutritional support to dysfunction the distal fistulous segment lead to early closure of the fistula.
- Preoperative patient's status such as duration of peritonitis and skill of resident surgeon was found important in developing faecal fistulae.
- Overall mortality amongst the patients of our series was 18.75%, 20% mortality was seen among the patients of small bowel fistula and 14.28% was seen in patients of large bowel fistula.

- Septicaemia accounted for majority of the deaths (12.5%) followed by electrolyte imbalance/ malnutrition (3.125%) and pulmonary complications (3.125%).
- While concluding we agree that achieving the adequate level of nutrition is mandatory in patients of faecal fistulas and surgical intervention should be undertaken if the fistula shows no sign of healing for atleast four weeks. However, despite of all possible steps to treat the patients, outcome still may be gloom. There is still a room for improvement in the management of patients with faecal fistulas in our set up. Early recognition, control of septicemia with drainage of abscesses, control of fistulas, institution of Octreotide and nutrition are few steps that help in decreasing the mortality and morbidity of the enteral failure which results from gastrointestinal fistulas.

In the end it is concluded that faecal fistula is a post operative complication with significant morbidity and mortality in relation to patient on one side and a lot of dedicated effort in limiting the morbidity (malnutrition, electrolyte imbalance, sepsis) to be performed by a doctor on the other side with utmost care of the patient with faecal fistula.

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