



# KARNATAKA STATE CHAPTER OF ASSOCIATION OF SURGEONS OF INDIA



# POSTOPERATIVE COMPLICATIONS How did I manage?

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**Dr K Rajgopal Shenoy**, Chairman KSC - ASI 2025-2026

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*Dedicated to our Patients*



**KARNATAKA STATE  
CHAPTER OF ASSOCIATION  
OF SURGEONS OF INDIA**

**KSC-ASI HAND BOOK ON  
POST OPERATIVE  
COMPLICATIONS**



**Chief Editor**

**Dr K Rajgopal Shenoy,**  
Chairman KSC - ASI 2025-2026

**Co-Editor**

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Chairman Elect KSC-ASI 2025-2026

## DISCLAIMER

Medical science is the most challenging and ever-changing field. In the field of surgery, many advances also take place. The views and opinions expressed in the book and methods of managing in the book are authors' own and related to experiences. The book is published only with the intent of sharing the knowledge which may help fellow surgeons while dealing with the occasional complications. If any unforeseen complications or serious complications happen while trying to follow these methods/practices, neither the editors, nor KSC-ASI or any authors will be held responsible. Readers are requested to refer to the standard guidelines which are in practice while treating such complications. You are requested to get permission from the authors directly if you want to reproduce the pictures/text/or any other material from the book. However, you can also contact by email to chief editor of the book: [kallyarajgopalshenoy@gmail.com](mailto:kallyarajgopalshenoy@gmail.com)

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## Foreword



I am happy and proud to write the foreword for this book “Postoperative complications- How did I manage” authored by twenty experienced surgeons who share their vast expertise on the management of complications encountered during surgery. As these complications arise from procedures that are routinely performed by general surgeons, they are situations that every practising surgeon may possibly face during the course of their professional life.

This book systematically sheds light on the recognition and effective management of such commonly encountered complications, making it a highly practical and valuable guide. I strongly recommend that every general surgeon keep this book readily available as a reference in daily surgical practice.

I congratulate the entire team of expert authors for their sincere and dedicated efforts in bringing out this important academic work. I also express my sincere thanks to Prof. Rajgopal Shenoy, a teacher par excellence and the current Chairman of the Academic Council of the Association of Surgeons of India and chairman of Karnataka State Chapter of Surgeons, for taking a leading role in conceptualizing and guiding this publication.

My best wishes to all of you involved in this much needed venture.

**Prof D Maruthu Pandian**

President 2026

Association of Surgeons of India

# Foreword



Complications Happen. If you meet a surgeon who claims he / she has had no complications, it is a matter of only 2 alternatives – either they have not done enough operations, or, that they are simply not telling the truth.

Every human being is an unique biological specimen. They vary in their response to surgical trauma, for the same indication and same procedure. Add surgical skills and the relationship of the surgeon to the patient, we fall into a groove where complications are to be expected. Hence it our constant endeavor to keep this from happening. But, when they happen, to know how to safely navigate out of the complication.

I am very pleased the KSC- ASI is bringing out this handbook, with a unique style of presentation, using the clinical situation and the appropriate response to rectify the situation. I am sure this will be welcome information for the surgical community at all levels, and thank the team for their best efforts to put this together.

## **Dr C S Rajan**

Emeritus Consultant Surgeon, Bengaluru

Past Chairman KSC-ASI

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## PEARLS OF WISDOM



No surgeon can escape from '*Postoperative complications*' during his/her professional career. The common man often attributes them to the surgical error which is not always true. Many of them are the events in the natural course of the disease. Surgical trainees should anticipate and proactively take steps to prevent them, detect them early and treat them. There are many books on this topic but this book stands out because of the method of presentation; experienced teachers have written about the actual cases managed by them and the lessons learnt out of them.

I congratulate the KSCASI for thinking about such a topic, and the authors for their time and effort towards their contribution.

**Dr K. ASHOK GODHI**

Past Chairman KSC - ASI

## PEARLS OF WISDOM



I would like to congratulate Chairman of KSC-ASI and academic director ASI, Dr.K.Rajgopal Shenoy and his entire team of authors and KSC -ASI for bringing out this unique first time project of KSC-ASI Hand book on postoperative complications, How did I manage?

It is important to have knowledge but more important to have wisdom and rich experience specially to manage unanticipated and unexpected postoperative complications. Undoubtedly book will be a ready reckoner for practicing surgeons and post graduates. I wish and hope KSC-ASI will release every year one book on post operative complications, how I managed?.

### **Dr. G. Siddesh**

Past Chairman KSC-ASI  
Director Social Service ASI

## PREFACE

“You are a true surgeon from the moment you are able to deal with your complications “

Prof. Owen H. Wangenstein

“Surgeons must be very careful when they take the knife: Underneath their fine incisions Stirs the Culprit-Life! - Emily Dickinson

**This is the first time a unique project such as this - a book compiled by KSC surgeons, writing about complications they have encountered and how they have managed. Don't you think it is unique and it is required?** As surgeons, we strive relentlessly to prevent complications due to surgery. Yet despite our best efforts, these are inevitable. It is often said that a surgeon without complications is a surgeon who is not operating. The way a surgeon handles the complications reflects his ability and skill. **It also needs good art of communication and counselling. Every complication is a lesson learnt. In this world of litigations complications may attract huge penalties.**

With countless surgeons operating every day, there is an immense opportunity to learn from how a specific complication occurred and how it was handled. Such knowledge would help us prevent errors during surgery and provide guidance as to how a difficult situation was handled. **Experience is the best teacher.** When surgeons share their experiences, the learning acquires a deeper and personal dimension. It also tells us that we should never be shy to talk about the complications.

Young surgeons, at the start of their career may feel lost and disheartened when they come across a complication. When they realise that complications can occur even in the hands of best and experienced surgeons, they will definitely develop a confidence to perform surgeries rather than being discouraged by the thought of complications. This is the main idea of writing this book on “Complications, how did I manage?”. I hope all the readers would find these insights valuable and appreciate the surgeons who did not shy away from sharing their experience on surgical

complications. We welcome your criticisms and suggestions.

We would like to thank Karnataka State Chapter of Association of Surgeons of India -KSC-ASI for giving us permission to write this book. Our past chairman and a respected senior surgeon Dr. Shivaram HV has not only contributed a chapter but also sponsored these books to the first 300 surgeons who registered and participated in the 44<sup>th</sup> KSCASICON at Raichur. We are extremely thankful to Dr Shivaram HV for his contribution to this novel cause.

We would like to express our gratitude to Prof. Vijayendra Kedige, Professor of Surgery, KMC Manipal and Dr Anitha Nileshwar (Shenoy), Professor of Anaesthesiology, KMC Manipal for carefully checking manuscript and correcting with utmost dedication. We would like to thank Mr. Wilfred Lobo, Mrs Anitha Lobo for typesetting and preparing this book at short notice, and to Chetana Printers, Mangalore. We apologies for any errors in grammer or spelling found in this book.

**Dr K Rajgopal Shenoy**

Chairman KSC - ASI 2025-2026 (Chief Editor)

**Dr. Naaz Jahan Shaikh**

Chairman Elect KSC-ASI 2025-2026 (Co-Editor)

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**Invited article - Clinical Wisdom**

*Prof Ashok Kumar KV, Prof Shankarappa, Prof Sacchidananda, Dr Kaveri, Dr Manjunath, Dr Vishnu, Dr Kapil Kishore.*

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# 1

## Postoperative Hyperkalemia after Ileostomy: How did i manage ?



● Dr. Ashok Godhi

### CASE REPORT:

Mr NZ, A 70 year old gentleman, a known case of hypertension and chronic kidney disease (CKD) had noticed pneumaturia and presence of fecal matter in the urine associated with frequency and burning micturition. MRI, colonoscopy and biopsy had revealed colo-vesical fistula due to diverticulosis. For further management, he was referred to KLES' Dr.Prabhakar Kore Hospital and Medical Research centre, Belagavi.

Initial investigations were within normal limits except for serum potassium, which was at the upper limit of the normal range. A staged surgical approach was undertaken. Stage 1: Fecal diversion with end-ileostomy. Recovery was uneventful. Stage 2 (after 2 months): Laparotomy, disconnection of the fistula, bladder repair, sigmoid segmentectomy, and end-to-end anastomosis followed by uneventful recovery. Closure of the ileostomy was scheduled approximately 8 weeks later. Postoperative potassium levels fluctuated between 3.44 and 5.64 mmol/L.

## WHAT DID WE DO ?

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Before the third procedure, bowel preparations led to severe diarrhea via the ileostomy and the patient was admitted with severe dehydration, acute renal decompensation, hyperkalemia (serum potassium  $>6.5$  mmol/L), metabolic acidosis, and oliguria (urine output 100 ml/24 h). He was stabilized with hydration and hemodialysis, and discharged with dietary potassium restrictions.

After 2 weeks, the patient was readmitted for third stage operation. The potassium levels were increasing in spite of medical measures which could temporarily decrease the serum potassium but could not sustain it for long. ECG remained normal. The case was posted for surgery but postponed twice due to hyperkalemia and the risk of cardiac arrest on table.

## AT THIS STAGE WE HAD TWO OPTIONS

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1. Keep the ileostomy. Maintain potassium homeostasis by hemodialysis, peritoneal dialysis or renal transplantation; patient will live with the morbidity for the rest of his life.
2. Accept the risk, close the ileostomy and face the consequences.

After careful counselling, we chose the second option. With aggressive medical correction, potassium was brought down to 4.8 mmol/L and immediately we undertook the operation.

- Stage 3: Ileostomy was closed with ileo-ileal anastomosis under general anesthesia. Intra and postoperative course was uneventful.

To our surprise serum potassium normalized rapidly. He was discharged with potassium of 3.5 mmol/L. At one month follow-up, the wound had healed; he reported normal diet and bowel habits, gained weight, and maintained normal hematological, metabolic and biochemical parameters (potassium: 3.0 mmol/L).

## DISCUSSION:

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Three questions which occurred to us were:

1. How did potassium levels normalize after the closure of ileostomy?
2. Can colon provide backup support to the failing kidneys?
3. After ileostomy, can the defunctioned colon excrete potassium?

### Literature search:

Colonic mucosa increases potassium excretion in CKD patients. This patient had compensated CKD with normal electrolytes. He underwent fecal diversion in the first stage, sigmoid segmentectomy and bladder repair in the second stage followed by uneventful recovery. Due to iatrogenic diarrhea through ileostomy and severe dehydration, he sustained acute insult to the existing CKD, resulting in renal decompensation and hyperkalemia. When intestinal continuity was restored by closure of ileostomy and ileo-ileal anastomosis, potassium levels rapidly dropped to normal range and remained so without any additional medical support. This shows that the defunctioned, empty colon was unable to excrete potassium, and when the intestinal continuity was restored and the fecal matter started passing through the colon, the colonic mucosa was able to excrete potassium in excess of its normal physiological limits thus restoring the normal levels of potassium.

An adult person's average daily intake of potassium is about 100 mmol. 90% is excreted by kidneys under the influence of aldosterone; fecal loss accounts for 10% which is independent of aldosterone. Several studies in persons with normal renal function have measured potassium in the ileostomy output and in the normal rectal fecal output. The ileostomy output is about 5 mmol/day and the rectal fecal output is about 9-10 mmol/day; this has proved that the colonic mucosa normally secretes about 5 mmol/day of potassium which is excreted in the feces. In renal failure patients, fecal loss increases two to three fold to compensate for the decreased renal excretion of potassium to maintain homeostasis- an amazing adaptive response of the colon. This is proved by measuring the daily fecal excretion of potassium in

normal persons and in renal failure patients.<sup>1</sup> This compensation starts when the creatinine clearance drops to less than 5 ml/min.

Nina Kononova et al have published a case report of an End Stage Renal Disease patient who developed ischemic colitis and underwent ileocecal resection and end ileostomy.<sup>1</sup> She developed hyperkalemia. After closure of ileostomy, the potassium levels were restored to preoperative levels.

## LESSONS LEARNT

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1. In renal failure, the colon can partially compensate by increasing fecal excretion of potassium in excess of its physiological limits to maintain the potassium homeostasis, thus providing backup support to failing kidneys;
2. In patients with ileostomy, the defunctioned colon cannot excrete potassium to compensate for the failing kidneys.
3. In chronic renal failure patients, fecal diversion by ileostomy may result in life-threatening hyperkalemia.
4. Restoring intestinal continuity by reversal of ileostomy restores the compensatory potassium excretory capacity of the colon and reduces dependence on dialysis.

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# 2

## Caesarean section and gross distension of abdomen. What is the diagnosis and How did I manage?



● Dr K. Rajgopal Shenoy

### CASE REPORT:

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28-year-old, nil premorbid, pregnant lady underwent emergency lower segment Caesarean section by Pfannenstiel incision in view of fetal distress. Postoperatively, the patient complained of abdominal pain, abdominal distension, and vomiting. The patient was diagnosed to have paralytic ileus and managed conservatively with nasogastric tube insertion, intravenous (IV) fluids and symptomatic treatment. However, she continued to have abdominal distension and tachycardia even after 3 days of treatment. She was referred to our center for further treatment. She was receiving Piperacillin-Tazobactam combination.

### EXAMINATION FINDINGS:

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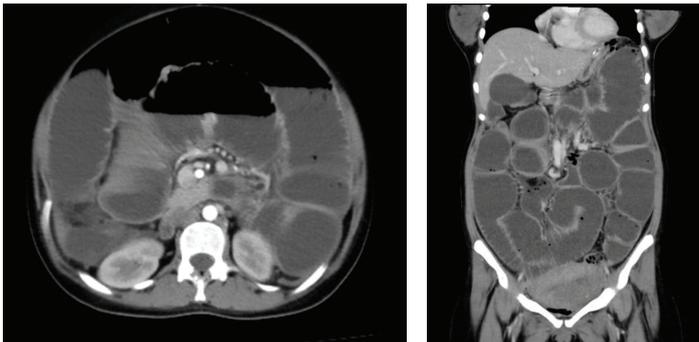
Pulse rate: 120/min, RR: 26/min, BP: 100/60 mmHg. PA: Abdomen was distended. There was tenderness in epigastric region. Bowel sounds were absent but there was no guarding

and rigidity. A Gynecology consultation was obtained. They opined that it was post-Caesarean ileus, uterine hematoma and active intervention was not required. A diagnosis of postoperative ileus following Caesarean section with hypovolaemic shock was made. Sepsis was also considered.

**Resuscitation/ Investigations:** Nasogastric aspiration was done and 500 ml of feculent contents were drained. A rapid bolus of IV fluids (Ringer lactate) was given followed by infusion of 150 ml/h. Antibiotics were continued, urinary bladder catheterisation done. About 30 ml urine was drained. Central line catheterisation was done and volume replacement was monitored. Plain X ray abdomen showed features of ileus? obstruction. There was no free gas under the diaphragm. Total WBC counts were elevated 16,000 cells/cumm. CECT report showed dilated small bowel loops, fluid filled with tapering at the level of terminal ileum - likely paralytic ileus. Large bowel loops were collapsed. There was no evidence of perforation.



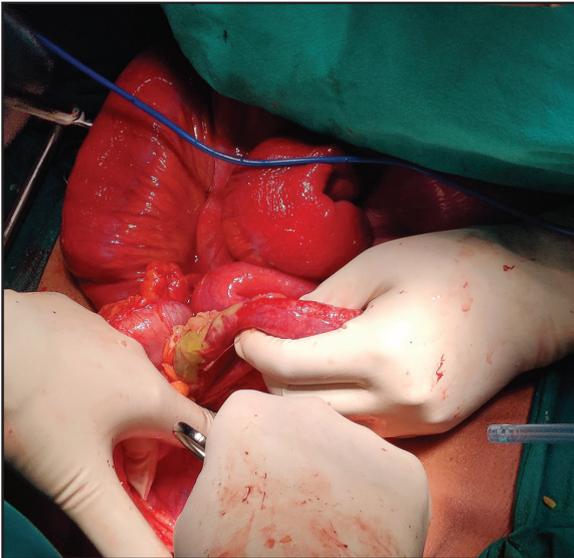
Plain X -ray showing dilated intestinal loops



CECT abdomen showing grossly dilated intestinal loops without any perforation or leakage of the dye

## WHAT DID I DO? EXPLORATORY LAPAROTOMY

- Within a few hours of admission (4 hours), in spite of resuscitation, pulse rate increased to 140 beats/ minute. Patient was anxious, restless, dehydrated. Tachycardia and tachypnoea persisted. In the previous 4 hours, urine output was about 100 ml.
- Midline laparotomy was done. Intraoperative findings: Grossly dilated small bowel up to ileocecal junction and infective gangrene patch (4 x 3 cm) over caecum.
- First, decompression of intestines was done. Right limited colectomy and proximal ileum was brought out as end-ileostomy
- Distal end of colon was stapled
- In the postoperative period, the patient had continuous high Ryle's tube output for 5 days followed by slow recovery by 10<sup>th</sup> day
- During follow up after 6 weeks, ileocolic anastomosis was done.



Operative photograph showing necrosis of Caecum with perforation

## DISCUSSION:

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Ogilvie's syndrome describes the phenomenon of an acute colonic pseudo-obstruction without a mechanical cause. It is rare but has been reported to occur after Caesarean section. It can lead to bowel perforation or ischaemia. The pathogenesis is multifactorial. Anatomically, the sacral parasympathetic nerves pass in close proximity to cervix and vagina, and terminate to supply left colon. Either an imbalance between sympathetic and parasympathetic nervous systems, a temporary neuropraxia or disturbance of sacral parasympathetic nerves due to surgery may lead to adynamic ileus of the colon. It is a potentially dangerous condition to be kept in mind by both obstetricians and general surgeons. Early diagnosis and prompt treatment can save such patients.

## LESSONS LEARNT

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- Thorough clinical examination -increasing pulse rate, tachypnea and hypotension prompted for laparotomy in this patient - not based on CECT findings only.
- Postoperative ileus and increased total WBC counts following Caesarean section can be due to many factors including pregnancy status but waiting beyond 3 to 4 days can be dangerous because it can give rise to cecal perforation. Danger lies in delay, not in the laparotomy.

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# 3

## Desaturation after laparoscopic Cholecystectomy - What happened and What did I do?



Dr K. Rajgopal Shenoy

### CASE REPORT :

A 50-year-old gentleman, nil comorbid, diagnosed to have gall stones, underwent **laparoscopic cholecystectomy** for acute cholecystitis, within 48 hours of the symptoms. Dissection of gall bladder was difficult, colon was adhered to gall bladder and he had frozen Calot's triangle. Cholecystectomy was done. The surgeon kept a tube drain. On table, no bile leak could be identified. In the postoperative ward, the anesthetist noticed a few changes in the monitor (ectopics) after shifting to postoperative ward. However, the patient was stable and was shifted to the surgical ward around 6 pm. Nursing staff noticed mild bile-tinged fluid in the drain around 10 pm associated with tachycardia. Saturation was around 96-97% at room air.

### 1ST POSTOPERATIVE DAY:

During rounds, the postgraduate reported that patient had c/o abdominal pain, mild distension and desaturated with SpO<sub>2</sub> 92%.

The patient was febrile. Tachypnoea and tachycardia were present. Drain output was 100 ml bile at 9 AM in the morning and increased to 300 ml on the 2nd postoperative day. Urine output was 700 ml in the last 24 hours. Bile leak, sepsis and hypoxia were suspected.



Bile in the collecting bag



Plain X-ray chest showing right basal haziness and pleural effusion

## WHAT HAPPENED AND WHAT DID I DO ?

**Investigations and interpretations:** Blood tests, liver function tests and renal function tests were ordered. Chest X-ray showed right pleural effusion and in the haziness right lungs. Bile was sent for analysis. High values of amylase with background of bile leak suggested it was not pancreatitis but absorption of amylase from peritoneal cavity. White blood counts were 18000 cells/cumm of the blood. **C-reactive protein was very high and procalcitonin was high, all indicative of sepsis.** Sepsis-induced cholestasis was responsible for minimal elevation of liver enzymes. ABG showed metabolic acidosis. In view of sepsis, the patient was shifted to ICU. Culture sensitivity of the bile and blood were sent.

**ICU admission and monitoring of vitals.** Oxygen therapy with 60% oxygen was started and titrated to maintain an oxygen saturation > 95%. Chest physiotherapy and incentive spirometry were given. He did not require invasive ventilation.

Step up antibiotics: Course of Piperacillin/Tazobactam combination was started. Paracetamol was given IV 8th hourly.

**Specific plan / what did I do ?** Gastroenterology (GEC) consultation was given on the 2nd postoperative day. Emergency ERCP followed by stenting was done as there was bile leakage from the common hepatic duct. By the 6th day, sepsis improved. Patient had fever. An ultrasound examination of the abdomen revealed collection in subhepatic space on the right side. A pig tail catheter was inserted. On the 10th day, the patient was discharged with catheter.

**Follow up:** Pigtail catheter was removed after 15th day of surgery. There was no wound infection Histopathology revealed acute cholecystitis with perforation of gall bladder.

**Discussion:** Cystic duct leak is the commonest biliary complication of cholecystectomy . Frequency of cystic duct leak ranges from 0.07 to 0.63% and in large series up to 1%. Bile leak after laparoscopic cholecystectomy is uncommon but can occur in 0.3- 2.7% of patients. It is defined as the persistent leakage of bile from the biliary tree. This can arise from an injury to the common bile/ hepatic duct but it is generally accepted that the vast majority arise from the cystic duct stump or a sub-vesical duct of Luschka.

A bile leak may result in a biliary fistula, a subhepatic/ subphrenic collection and localised or generalised peritonitis. Problems of bile leak include bile peritonitis, subhepatic abscesses, bile duct stricture, and perihepatic inflammation leading to fibrosis due to bile leaks Endoscopy with sphincterotomy and stenting is the first line of treatment with a success rate greater than 90%. The main indication for ERC is persistent bile leak at a median of 5 days (range, 2-66 days) after the original laparoscopic cholecystectomy. A 10-French × 7 cm plastic CBD (5-7-cm long) internal stent between the common bile duct and the duodenum stent was placed. Leak persisted after 8 weeks and was confirmed by ERCP. The original stent was replaced by a fully covered temporary 10 × 60 mm metal CBD stent. Leak stopped after 15 days and stent was removed.

- **Lessons learnt:** Laparoscopic cholecystectomy for acute cholecystitis has increased chances of bile duct injury. Repair of these should preferably be attempted by an experienced surgeon. Proper communication, counselling and documentation before surgery about necessity to re-explore and complications should be explained to the patient and documented. Complications should be immediately recognized and treated accordingly on an urgent basis which will give good results. Danger lies in delay.
- In our patient, arrhythmias were noted within a few hours after surgery and later hypoxia. Hypoxia itself is dangerous. Low blood oxygen levels can lead to serious consequences, including cardiac issues (arrhythmias, myocardial ischemia) and cognitive dysfunction. Post-surgical patients are already at risk for hypoxemia due to pain and the effects of anesthesia, and a complication such as a bile leak exacerbates this risk.

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# 4

## Mesh Infection After Laparoscopic Ventral Hernia Mesh Repair (IPOM) How did I manage?



● Dr H. V. Shivaram

### CASE REPORT:

A 57-year-old woman (BMI 28 kg/m<sup>2</sup>) presented to a general surgeon with a ventral hernia in the periumbilical region for two years. She underwent laparoscopic intraperitoneal onlay mesh (IPOM) repair at a local nursing home. Her initial postoperative recovery was uneventful for two months, after which she developed pain and swelling at the operative site. The operating surgeon diagnosed a seroma and aspirated it, followed by oral and later intravenous antibiotics. Repeat aspirations were performed twice, but symptoms persisted.

When she presented to us, she reported 5 kg unintentional weight loss, intermittent fever, and pain. Examination showed induration at the umbilical region and swelling at prior port sites (Figure 1). Her nutritional status was suboptimal. She was admitted for stabilization, nutritional rehabilitation, and correction of vitamin and mineral deficiencies.



*Figure 1: Distended abdomen*

### **INVESTIGATIONS:**

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Contrast-enhanced CT abdomen revealed a loculated intra-abdominal collection around the mesh, suggestive of mesh infection (Figure 2). Laboratory tests showed mildly elevated WBC count and CRP.



*Figure 2: CT Abdomen*

## MANAGEMENT:

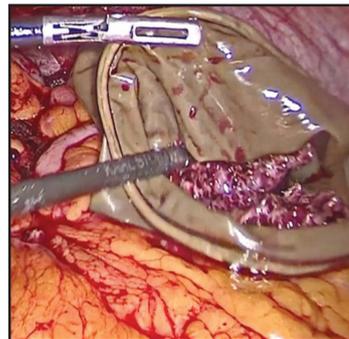
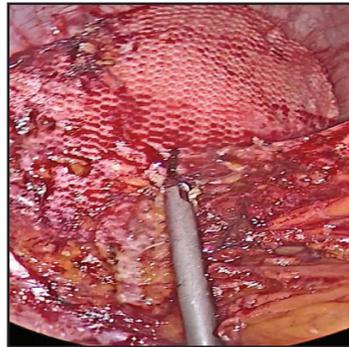
A multidisciplinary plan was formulated with the Infectious Disease Specialist. The patient was counselled that:

- The mesh was likely chronically infected
- Complete mesh explantation was required for cure
- Recurrent ventral hernia was a possible long-term consequence

Under general anesthesia with epidural analgesia, laparoscopic mesh explantation was performed. Dense adhesions were released, the entire mesh along with all fixation tackers was removed, and the abscess cavity was thoroughly irrigated with copious saline. The mesh was retrieved using an endobag through a 12-mm port. Port site sinuses were curetted and left open.

**Samples (mesh, pus, and abdominal wall tissue) were sent for:**

- Aerobic and anaerobic culture



Infected mesh and its removal-operative photographs

- Fungal culture
- Atypical mycobacterial culture and PCR

Postoperatively, the patient improved gradually. Cultures grew multidrug-resistant organisms, and tissue culture confirmed atypical mycobacterial infection. She underwent prolonged antimicrobial therapy under Infectious Disease specialist's supervision. Complete wound healing required approximately 12 months.



At 18-month follow-up, she had a small recurrent ventral hernia, currently asymptomatic, for which delayed reconstruction is planned.

## DISCUSSION

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Mesh reinforcement in ventral hernia repair reduces recurrence rates but increases the risk of chronic infection, which can be difficult to eradicate. Biofilms on prosthetic materials protect bacteria from host immunity and antibiotics, making chronic infections refractory to conservative measures. [1,2]

*Staphylococcus aureus* (including MRSA) and coagulase-negative staphylococci are common pathogens.[3] In recent years, atypical mycobacteria have emerged as an important cause, often linked to inadequate sterilization of laparoscopic instruments, particularly when low- temperature plasma sterilization cycles are not properly validated.[4]

Mesh characteristics influence infection susceptibility. Microporous or multifilament meshes are more prone to harbouring biofilms compared to large-pore monofilament polypropylene.[5]

Definitive treatment of chronic mesh infection almost always requires complete mesh removal, preferably laparoscopically when feasible, due to reduced wound morbidity and better visualization.[6]

## PREVENTION STRATEGIES

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- Strict aseptic technique and validated sterilization protocols
- Appropriate mesh selection and mesh handling
- Patient optimization (nutrition, glycemic control, smoking cessation)
- Prophylactic antibiotics based on institutional protocols

## LESSONS LEARNT

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1. Chronic mesh infection requires complete mesh explantation; prolonged antibiotics alone are ineffective due to biofilm.
2. Proper sterilization of laparoscopic instruments (hydrogen peroxide gas plasma or steam autoclave) is essential to prevent atypical mycobacterial infection.
3. Repeated seroma aspiration increases the risk of introducing infection.
4. Tissue and pus culture, including atypical mycobacterial testing, is critical for diagnosis and targeted therapy.

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# 5

## Surgical Site Infection (SSI) after repair of incisional hernia How did i manage?



● Dr Badareesh L.

### **CASE REPORT :**

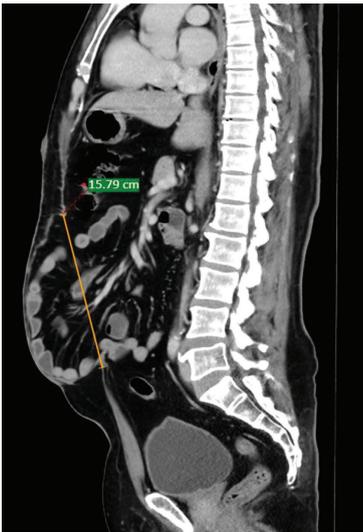
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A 53-year-old male presented with abdominal pain and vomiting with distension of the abdomen. Diagnosis of irreducible incisional hernia was made (lower abdomen incisional hernia).

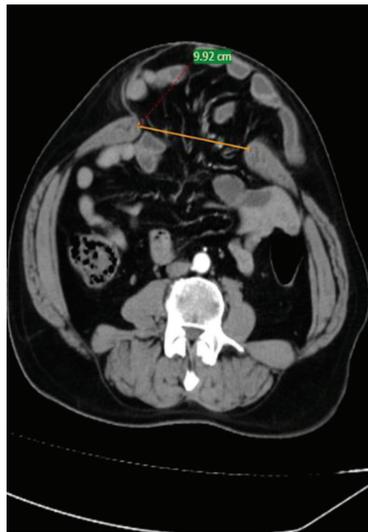
She had a prior history of emergency laparotomy and splenectomy. The patient underwent incisional hernioplasty (onlay + rectorectus mesh) with anterior component separation. Drains were placed in the retrorectus plane and subcutaneous plane. On postoperative day 2, erythema and epidermal necrosis were noted around umbilical region.



Necrosis of skin and soft tissues



Sagittal view



Coronal view

CT abdomen showing a defect of 16 x 10 cm with herniation of small bowel loops.

### WHAT DID WE DO ?

Drain removal was done and the patient discharged with daily dressings. On follow up, post-demarcation of epidermal necrosis,

he underwent debridement under general anaesthesia where necrosed abdominal wall and exposed onlay mesh were removed. Currently, the patient is on follow up and is on weekly VAC application change. He is planned for reassessment and wound closure with secondary suturing/ SSG.



Post debridement



Post vac application

## LESSONS LEARNT

- Loss of domain hernias are always challenging to treat
- Postoperative surgical site infections following ventral hernia surgeries might require removal of the mesh.

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# 6

## Abdominal Wall Sinus Following Lower Segment Caesarean Section - How Did I Manage?



● Dr. Sunil Krishna M

### CASE REPORT:

A 30-year-old female, P2 L2, had undergone an elective lower segment Caesarean section (LSCS) under epidural anesthesia with post-partum intrauterine contraceptive device (IUCD) insertion at an outside hospital. About two months later, she presented with complaints of pain and purulent discharge from her LSCS scar site.

The pain was dull, continuous, and of mild intensity, associated with non-foul-smelling purulent discharge from multiple openings in the scar line. There was no history of fever, vomiting, bowel or bladder disturbances. She was initially treated conservatively with oral antibiotics and analgesics for five days without improvement and was referred to KMC Manipal for further management.

On examination, the patient was conscious, co-operative, and oriented with stable vitals (BP 120/70 mmHg, PR 82 bpm, RR 22 cpm, SpO<sub>2</sub> 95% on room air). A 2 × 2 cm tender, firm swelling

was palpable in the right iliac fossa within the subcutaneous plane. The LSCS wound showed gaping on the left aspect with purulent discharge from two sinus openings - one in the midline and one on the right side. There was no erythema or local rise of temperature. The abdomen was soft with normal bowel sounds and no organomegaly.

Ultrasound of the abdomen and pelvis revealed sinus tracts with subcutaneous collection. Contrast-enhanced CT (CECT) abdomen and pelvis with sinogram demonstrated multiple sinus tracts in the abdominal wall without intra-abdominal communication.

Following pre-anesthetic evaluation, in view of the clinical suspicion of an enterocutaneous fistula, the patient underwent diagnostic laparoscopy and excision of the abdominal wall sinus under general anesthesia. Intra-operatively, there was no intra-abdominal collection. The uterus, small bowel, and large bowel were normal. The sinus openings were confined to the abdominal wall without peritoneal extension. A right iliac fossa subcutaneous collection was noted. The wound was healthy post-operatively and she was discharged on tablet cefuroxime for five days.

Histopathological examination revealed a sinus tract with granulomatous inflammation, AFB negative. GeneXpert and microbiology cultures showed no growth. The Infectious Disease (IFD-2) team reviewed her in view of the granulomatous histology, and a diagnosis of non-tubercular mycobacterial (NTM) infection was made. She was started on injection Amikacin 1 g IV once daily, tablet Levofloxacin 500 mg once daily, and tablet Azithromycin 500 mg once daily for 14 days, and was advised to withhold breastfeeding during treatment to avoid infant exposure.

Secondary suturing was performed two weeks later, following which she developed a surgical site infection with seroma that was drained and managed conservatively. On her last follow-up at six weeks, surgical site was healed with no discharge noted.

## **DISCUSSION :**

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Abdominal wall sinus following caesarean section is uncommon<sup>1</sup>. The differential diagnoses include retained foreign body, suture granuloma, tuberculosis, actinomycosis, and non-tubercular

mycobacterial infection. The absence of intra-abdominal communication and AFB negativity ruled out enterocutaneous fistula and tuberculosis respectively.

Non-tubercular mycobacterial (NTM) infections are increasingly recognised as causes of chronic post-operative wound infections<sup>2</sup>, particularly in association with reused surgical instruments or contaminated antiseptic solutions<sup>3</sup>. They often present as delayed, non-healing discharging sinuses with minimal systemic symptoms, and may mimic pyogenic or tuberculous infections<sup>1</sup>.

Diagnosis requires a high index of suspicion, with correlation of clinical, radiological, and histopathological findings. The mainstay of management includes complete surgical excision of sinus tracts and appropriate antimicrobial therapy.

## LESSONS LEARNT

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1. Chronic, non-healing post-Caesarean sinus should raise suspicion of atypical infection such as non-tubercular mycobacteria.
2. Early imaging (sinogram, CT scan) is essential to rule out enterocutaneous communication.
3. Correlation between histopathological and microbiological findings is crucial for accurate diagnosis.
4. Early surgical excision combined with specific antimicrobial therapy ensures optimal outcomes.

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# 7

## Infraumbilical Discharging Sinus Following Appendicectomy and Dermoid Cyst Excision - How did I manage?



Dr. Ramesh Tambat

### CASE PRESENTATION

A 28-year-old female presented with complaints of lower abdominal pain for one week, localized to the left lower abdomen. She was admitted under the Department of Obstetrics and Gynaecology. Investigations revealed a right ovarian dermoid cyst, for which she was initially managed conservatively.

In view of persistent pain, a CECT abdomen and pelvis was performed, and she subsequently underwent laparoscopic dermoid cyst excision.

Postoperatively, the patient developed right iliac fossa pain, insidious in onset, gradually progressive, and colicky in nature. There was no associated vomiting or fever. An ultrasound abdomen and pelvis revealed acute appendicitis. The patient was initially managed with antibiotics at an outside hospital and later referred to our institution. A laparoscopic appendicectomy was performed without intraoperative complications. She was discharged on postoperative antibiotics.

On the 10th postoperative day, the patient developed infraumbilical pain, dull aching in nature, and gradually progressive. On examination, induration was noted in the infraumbilical region without visible swelling. Ultrasound abdomen and pelvis showed a 90 cc collection in the infraumbilical region. Incidentally, the patient was found to have a 6-week intrauterine gestation and was managed conservatively with antibiotics in view of pregnancy.

Subsequently, the patient developed a discharging sinus at the infraumbilical region.

### **ON EXAMINATION**

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- General condition: Febrile (101°F)
- Abdomen: Tenderness, induration, and erythema noted in the infraumbilical region
- Fluctuation: Positive
- Sinus: Present at the umbilicus with minimal greenish purulent discharge

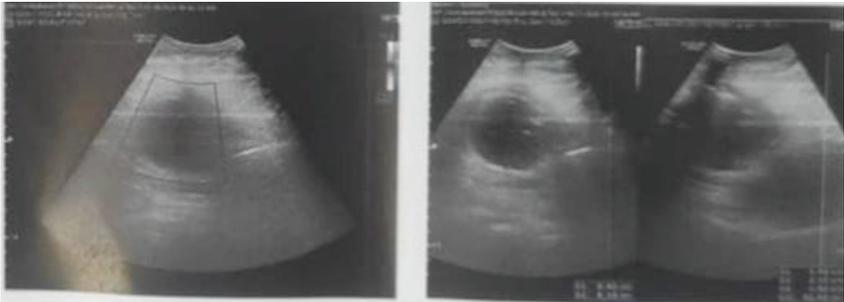
There was no history of cough, weight loss, or other systemic symptoms.

### **INVESTIGATIONS**

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- Ultrasound Abdomen and Pelvis: Infraumbilical abscess measuring approximately 100 cc
- Pus Culture and Sensitivity: Sent for bacterial growth
- CBNAAT: Positive for *Mycobacterium tuberculosis*





## MANAGEMENT

Under aseptic precautions, an incision and drainage (I&D) procedure was performed through a cruciate incision at the most fluctuant point. Approximately 100 cc of purulent material was drained and sent for culture and CBNAAT testing.

The patient was started on broad-spectrum intravenous antibiotics, and regular wound dressings were done. Post-procedure, the patient showed marked symptomatic improvement and was discharged in stable condition.

Follow-up CBNAAT results confirmed tubercular etiology (*Mycobacterium tuberculosis* detected). The patient was referred to the District Tuberculosis Centre for initiation of anti-tubercular therapy (ATT).

## **DISCUSSION**

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Postoperative discharging sinuses after laparoscopic surgery are rare and typically caused by bacterial infection or retained suture material. However, tuberculous infection should be considered cases with a non-healing sinus, particularly in endemic regions. In this case, the patient developed a tuberculous infraumbilical abscess and sinus following two laparoscopic surgeries. The exact mechanism could involve hematogenous spread or direct inoculation at the port site. The absence of systemic symptoms made the diagnosis challenging.

Diagnosis was confirmed through CBNAAT, a rapid and sensitive test for detecting *Mycobacterium tuberculosis*. Once diagnosed, prompt initiation of anti-tubercular therapy is crucial for complete resolution.

## **CONCLUSION**

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This case emphasizes the need to consider tuberculosis as a differential diagnosis in chronic postoperative discharging sinuses, particularly in endemic regions. Early microbiological confirmation and timely initiation of anti-tubercular therapy ensure better patient outcomes and prevent chronic morbidity.

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# 8

## Bile leak after Laparoscopic Cholecystectomy How did I manage?



Dr K Lakshman

### CASE HISTORY:

A 52-year-old lady who had had a 'routine' laparoscopic cholecystectomy for symptomatic gall stones two days previously, elsewhere, was referred to our centre for ICU care because she had become tachycardic and tachypnoeic 24 hours after the surgery.

On examination, she was looking ill. Her pulse was 110 /min, respiratory rate was 20/min. Her blood pressure was 130/90 mm Hg, Oxygen saturation was 95% with 2 litres of oxygen.

The abdomen was distended and was diffusely tender with no localising signs.

### INVESTIGATIONS:

Her haemoglobin was 12 g %, White cell count was 13000 cells/cu mm with 70% neutrophils. Her blood urea and creatinine were normal. Liver function tests were abnormal with a total bilirubin

of 2.8 mg/dL, direct bilirubin of 1.3 mg/dL and slightly raised enzymes.

An ultrasound examination showed a collection of turbid fluid of about 350 ml in the subdiaphragmatic and subhepatic spaces. This was described as an 'abscess' in the report. There was no intrahepatic biliary dilatation. the common bile duct (CBD) was not visualised. There was no significant fluid collection in the pelvis or the paracolic gutters (Figure 1).



Figure 1: An ultrasound examination showing a hypoechoic collection in the subdiaphragmatic space described as an 'abscess'.

An MRI and MRCP was undertaken. This confirmed the collection and showed no evidence of biliary obstruction. The area of bile leak was not 'seen' (Figure 2).

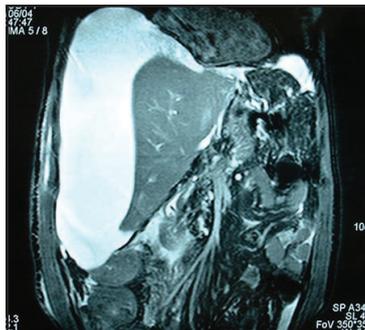


Figure 2: An MRI showing the subdiaphragmatic collection (T2 image).

An ERCP was done to delineate the biliary tree and 'see' the area of the leak. This showed that the dye extravasated from the right hepatic duct just proximal to the confluence with the left hepatic duct (Figure 3). An attempt to selectively stent the right hepatic duct was not successful.

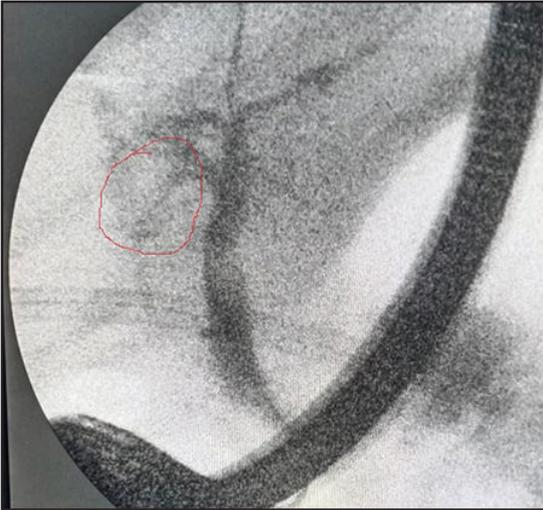


Figure 3: Snapshot of the ERCP showing the area of extravasation (Red circle). This was more evident in the dynamic pictures which showed the active leak

### WHAT DID I DO?

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The patient was admitted to the ICU. Apart from the peripheral line, an internal jugular central line was inserted under ultrasound control and central venous pressure monitoring was done. The patient was catheterised and hourly urine output was measured. A non-invasive blood pressure monitoring was carried out. Three litres of oxygen was administered through a nasal canula and oxygen saturation was continuously measured. The patient was kept fasting except for sips of fluid to wet the tongue. A Ryle's tube was inserted and left on continuous drainage. Intravenous fluids were administered. The antibiotic cover was with Cefaperazone-Sulbactam combination.

All the outlined investigations were completed on the day of her admission to our centre. She was taken up for a re-laparoscopy the next morning i.e., the 3rd morning after the original surgery. The laparoscopy showed a pool of bile in the subdiaphragmatic area (Figure 4). This pool was sucked out. A thorough washout was given with 2 litres of normal saline. The area of the bile duct and the hilum was visualised. No active leak could be seen. The visualisation of the hilar area was poor. Hence decided to convert to open surgery through an upper midline laparotomy.

At open surgery, the hilar area was explored. The confluence of the right and left hepatic ducts was about 1.5 cm distal to the hilar plate. The CBD was normal and about 6 mm in diameter. On washing the area with a jet of saline, a 3 mm hole was seen in the right hepatic duct just proximal to the confluence. This defect was closed using a single polydioxanone suture.

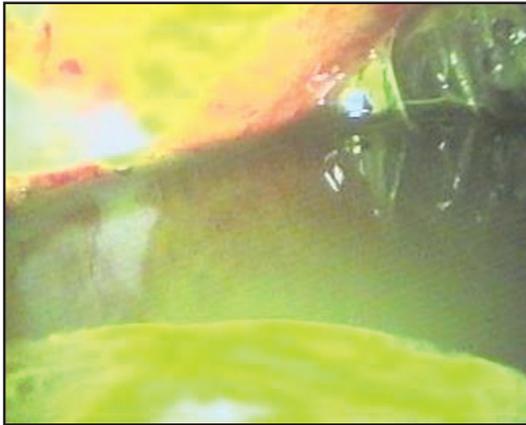


Figure 4; Initial view on inserting the laparoscope; pool of bile in the subdiaphragmatic area with some minor flimsy fibrinous adhesions.

An anterior choledochotomy was done. A size 12 Fr T-Tube with a gutter created in the vertical limb was inserted into the CBD and the long proximal part of the vertical limb was placed across the repaired defect in the right hepatic duct. The choledochotomy was closed superior to the horizontal limb of the T-Tube using 2-0 Polydioxanone. A further washout was given using 3 litres of

normal saline. A 16 Fr suction catheter was placed in the subhepatic space. The abdomen was closed by the mass closure technique and clips applied for skin closure.

### **POSTOPERATIVE COURSE:**

Her postoperative course was uneventful. She maintained her vitals well. The subhepatic drain showed minimal serosanguinous output. 250 ml of bile was drained via the T-tube and this progressively reduced over the next 3 days. The Ryle's tube was removed on the morning of 2nd postop day. The urine output was maintained and the catheter was removed on the 2nd postop day. The subhepatic drain was removed on the 4th postop day when the output was down to 25 ml. She was allowed clear oral liquids on 2nd postop day, full liquids on 3rd day and a soft diet on the 4th day. The T-tube was clamped on the 3rd postop day. She was allowed home on the 5th postop day with the T-tube clamped with instruction to remove the clamp if pain or fever occurred and report to the hospital immediately.

She had an uneventful course after discharge. She was brought back on the 10th postop day and a T-tube cholangiogram was done (Figure 5). This delineated a normal biliary tree with no leaks or filling defects. There was free flow of dye into the duodenum.



Figure 5: T-Tube cholangiogram; Delineates a normal biliary tree with no leak.

The T-tube was pulled out. She had a smooth course after this and was well, with normal clinical and biochemical parameters at 3 months after the second surgery.

## **DISCUSSION:**

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Damage to CBD during laparoscopic cholecystectomy is rare nowadays. The incidence is about 0.3 to 0.7%. It used to be very high in the mid nineties when laparoscopic cholecystectomy was a new procedure. Reported incidence at that time was as high as 5-8%.

The commonest cause for CBD injury is mis-identification of structures. Variations in biliary anatomy can be around 15-20% - some have reported even 50%. Other risk factors are a frozen Calot's triangle, high Body Mass Index, visceral adhesions and bleeding during surgery. Surgeon factors include inexperience and fatigue.

A lot of literature exists about safe cholecystectomy. The critical view of safety, the modified fundus first approach, keeping superior to the Rouvier's sulcus and being wary before clipping sizeable tubular structures, have been emphasised.

Various classifications exist for bile duct injuries. In principle, they take into consideration the level of damage, the degree of damage and the aetiology of damage. The commonly used classification is the Strasberg classification with the type E being further subclassified by Bismuth (Figure 6).

### **What should be done when one encounters a bile duct injury after laparoscopic cholecystectomy?**

The rule of thumb is that if the damage is detected on the table or within the first 3 days, immediate repair can be undertaken. What this repair entails will be discussed below.

If the damage is detected more than 3 days after the first surgery, it is best to wait 6 to 8 weeks provided the patient does not go into sepsis. The endeavour in this waiting period is to engineer a controlled biliary fistula, maintain adequate fluid and electrolyte balance, cover the patient with antibiotics and provide proper nutrition. After this waiting period, definitive repair is undertaken.

The common thread underlying all repairs is that it should be undertaken by experienced surgeons in well-equipped centres.

The surgeon who is not experienced in these repairs should undertake a thorough abdominal lavage through a laparoscopy or laparotomy (depending on the expertise in laparoscopy), get adequate drainage for the leaked bile through external drainage and refer the patient to a higher centre.

If the damage is minimal as in this case with a small defect, direct closure with adequate drainage through a T-tube insertion is adequate. In fact, if the ERCP stenting was possible to bridge this defect, that would have probably sufficed with a percutaneous drainage undertaken for the leaked pool of bile.

If there is substantial damage to the bile duct or complete transection, it is best to do a Roux-en-Y hepatico-jejunostomy. If the damage is low down as is seen in a low insertion of the cystic duct, a choledocho-duodenostomy may be considered.

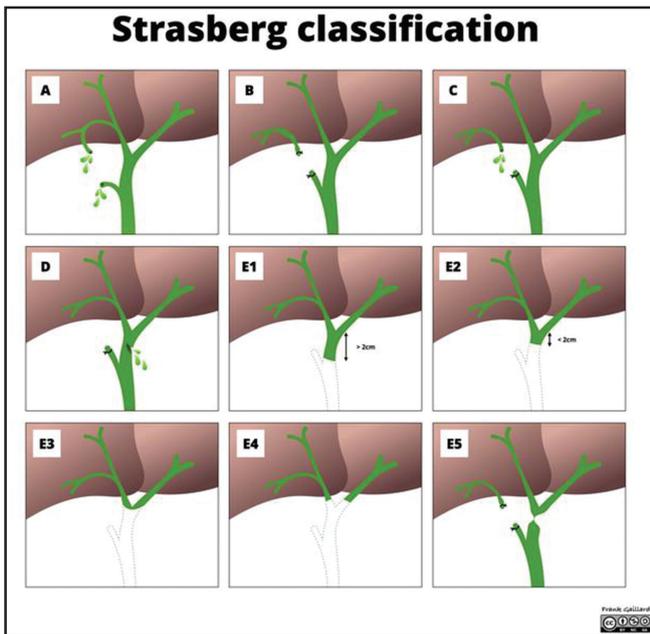


Fig 6 ; Strasberg Classification of bile duct injuries (Courtesy- Radiopedia.org)

## LESSONS LEARNT:

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- ❖ Many patients with biliary injury and bile leak may present with respiratory difficulty due to the sepsis and irritation of the diaphragm. In fact, this patient was referred to us for possible respiratory care. A high index of suspicion of some surgical complication must be entertained by all surgeons.
- ❖ When an intra-abdominal fluid collection is seen, it could be bile or blood, Our patient was haemodynamically stable, had maintained her haemoglobin and the quick workup showed a bile leak. If there is uncertainty one can always consider an ultrasound directed aspiration of the collection.
- ❖ If an on-table leak is suspected and the site of leak is not evident, an operative cholangiogram can give useful information.
- ❖ Is CT better or MRI/MRCP better? A triphasic CT is recommended. These two are complimentary. An MRI is marginally better as it is a dynamic study and can detect the site of damage more often than the CT. In this case, MRI did not give information about the site of damage.
- ❖ ERCP is a very useful tool. It can show the site and extent of damage and can also be therapeutic in cases where the damage is minimal. However, if the CBD is clipped across, ERCP fails to opacify the proximal biliary tree. In these cases, percutaneous transhepatic cholangiogram has to be considered.

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# 9

## Obstructive Jaundice post-Laparoscopic cholecystectomy - How did I manage?



● Dr Badareesh L

A 50-year-old, diabetic and hypertensive male, underwent interval laparoscopic cholecystectomy for calculous cholecystitis 45 days ago. Intra-operatively, the Calot's triangle was frozen, but the critical view of safety was achieved, and the cystic duct and cystic artery were ligated and clipped meticulously. He came for follow up and the period was uneventful. Histopathological examination reported chronic cholecystitis. Now he presented with 3 days of onset of upper abdominal pain radiating to the back., high coloured urine and pale-coloured stools with generalised weakness.



On examination, vitals were stable with him being afebrile, he was icteric, and per abdomen tenderness was elicited in the epigastric region.

His labs were: Hb: 14.3 g%, TLC: 13,600/cumm. S. Amylase 17 U/L Total Bilirubin: 15.64 mg/dL, Direct bilirubin: 12.01 mg/dL, AST:43 IU/L, ALT: 131 IU/L, ALP:413 U/L

Ultrasonography showed CBD diameter of 8.5 mm with mild central intrahepatic biliary radicle (IHBR) prominence.

He was admitted and started on IV antibiotics and kept NPO.

## **WHAT WAS DONE**

He underwent MRCP which showed: Well-defined lobulated cystic structure noted adjacent to the proximal part of CBD -? remnant cystic duct. Common bile duct was prominent in calibre (maximum calibre ~7.1 mm) with a T2 hypointense filling defect (~8 x 6 mm) noted in the middle 1/ 3 rd of CBD at the insertion of remnant cystic duct with mild retrograde central IHBR and remnant cystic duct dilation - s/ o choledocholithiasis. Distal CBD was normal in calibre.

He was referred to medical gastroenterology and underwent ERCP with partial clearance of the bile duct with pus exudation (sent for culture and sensitivity) and stent placed.

Post-procedure he developed ERCP induced pancreatitis with serum amylase 707 U/L and lipase 1655U/L. Liver functions improved with a total bilirubin: 7.71 mg/dL, Direct bilirubin: 6.02 mg/dL, AST: 33 IU/L, ALT: 53 IU/L, ALP: 302 U/L.



He was managed conservatively with antibiotics, analgesics and gradually stepping up diet and requires repeat ERCP and clearance of the bile duct after 4-6 weeks.

## LESSONS LEARNT

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- Not all obstructive jaundice after cholecystectomy is due to bile duct injury
- Thorough milking of cystic duct prior to clipping might prevent stone slippage into CBD
- ERCP will help clear the retained CBD stones

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# 10

## Bile duct injury following difficult laparoscopic cholecystectomy (post-ERCP): How Did I Manage?



Dr. Bharath S V

### CASE REPORT

A 34-year-old female with Type-2 diabetes mellitus for 2 years presented with 10 days of abdominal discomfort and progressive yellowish discoloration of eyes.

Initial clinical assessment

- **General:** Conscious, oriented.
- **Vitals:** Pulse 88/min; BP 110/70 mmHg.
- **Exam:** Icterus present; abdomen soft, non-distended, mild right upper quadrant tenderness; no guarding/rigidity.
- **Laboratory:**
  - Hb 10.6 g/dL
  - Total bilirubin 14.64 mg/dL; Direct 13.38 mg/dL
  - AST 76 IU/L; ALT 139 IU/L; ALP 166 U/L
  - Lipase 30.9 U/L (initial); CRP 1.05 mg/L
  - RBS 224 mg/dL

Hepatitis B and C negative

Clinical impression: Obstructive jaundice.

Imaging: Transabdominal ultrasound - cholelithiasis with dilated CBD 8 mm with moderate intrahepatic biliary radicle dilatation (IHBRD)

Plan: ERCP for duct clearance and stenting.

### ERCP and immediate post-ERCP course

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- Procedure: ERCP under monitored anesthesia care - CBD clearance and stenting performed successfully.
- Complication: Developed mild post-ERCP pancreatitis: lipase rose to 860.1 U/L on day 2 post-procedure (consistent with BISAP-0 categorization).
- Management: Conservative - bowel rest, IV fluids, analgesia, nasogastric decompression antibiotics (Piperacillin-Tazobactam continued), monitoring of vitals and urine output.
- Outcome: Clinical improvement seen; She was discharged on 6th day in stable condition with plan for interval cholecystectomy in 6 weeks.

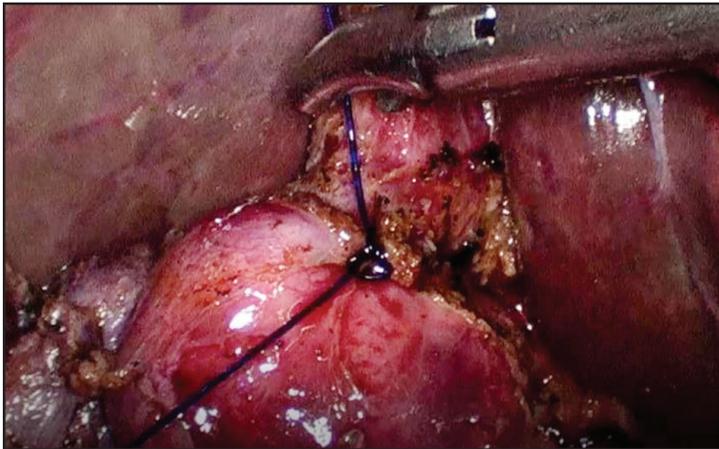
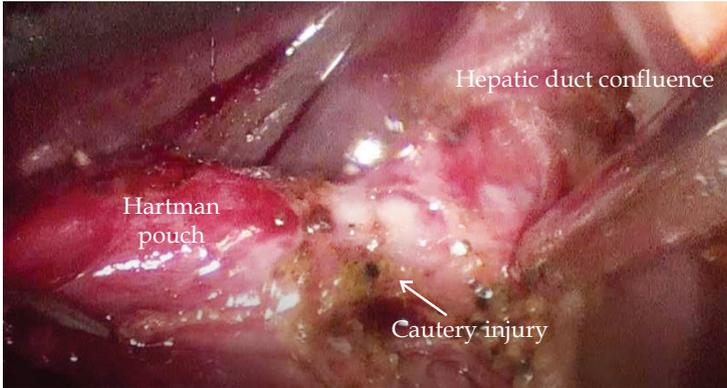
### Interval Cholecystectomy Admission And Operation

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- **Admission:** After 8 weeks, the patient was admitted electively for interval cholecystectomy. Pre-op optimization included endocrinology consultation for elevated glucose (RBG 260 mg/dL) and HbA<sub>1c</sub> 8.8%.
- **Pre-op investigations:** USG - CBD stent *in situ*; minimal pneumobilia; no obvious residual stones. ECHO normal.
- **Operative findings:** Dense omental adhesions to the gall bladder were present, with a markedly thickened gall bladder wall. Dissection of Calot's triangle was difficult due to dense adhesions. Dilated common bile duct with stent *in situ* felt. During dissection, an inadvertent bile duct injury occurred and was immediately recognized. Primary laparoscopic repair was attempted but could not be completed due to technical difficulty. Cholecystectomy was completed, and the gallbladder was extracted. The procedure was then converted

to open surgery, and the bile duct injury at the hepatic confluence was repaired using three interrupted 3-0 Prolene sutures. A subhepatic drain was placed, and the abdomen closed in layers.

- Immediate postoperative course: Tolerated diet; drain output serous; no bile staining. Hemodynamically stable.

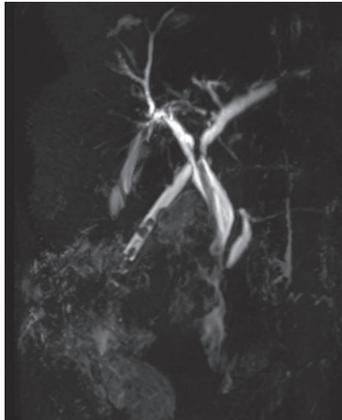


- Discharge: POD-2 with drain *in situ* and instructions for daily monitoring/dressing and early review.

### Post-discharge course - timeline with dates and outputs

- **POD 6:** Patient noticed purulent discharge from the Kocher's incision wound and underwent daily dressings at a nearby hospital.

- **POD 7:** Bile-stained fluid first recorded in drain - ? 60 mL.
- **POD 8:** Drain output 70 mL bile.
- **POD 9:** Drain output 80 mL bile.
- **POD 10:** Patient presented to hospital; MRCP performed ? reported bile duct injury (site not requiring immediate relaparotomy) and no intraperitoneal collection.
- **POD11:** Advised admission for observation and management but patient preferred home observation and agreed to return in 2 days.
- **POD 12- 15:** Drain output increased progressively 110 - 150 mL/day. The patient continued to remain hemodynamically stable.



- **POD 16:** Peri-drain leak noted; again, patient declined admission.
- **Till POD 23:** Drain output decreased progressively to ~20 mL/day. Clinical condition stable; no fever, no abdominal distension.
- **POD 28:** Drain accidentally came out at home.
- **POD 29:** Patient presented with persistent purulent wound discharge and was admitted for wound care and re-evaluation.

### Readmission assessment and management (9-15<sup>th</sup> Oct 2025)

**Clinical status on admission:** Vital signs stable (BP 110/70)

mmHg, PR 78/min, Temp 99°F). Local exam: right hypochondrial tenderness, purulent discharge at incision site, no guarding/ rigidity.

### **Investigations performed:**

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- LFT: Total bilirubin 0.46 mg/dL; AST 14 IU/L; ALT 7.2 IU/L; ALP 59 U/L - essentially normal.
- CRP: 5.16 mg/L.
- USG abdomen (09/10/2025): Mild central & peripheral pneumobilia (expected post-op/ERCP change). No intra-abdominal collection or residual leak detected. CBD 4.9 mm.
- Wound swab & C/S (09/10/2025): Numerous pus cells; Gram-negative bacilli; growth: *Escherichia coli* - sensitive to Amikacin, Meropenem, Piperacillin-Tazobactam; resistant to some cephalosporins/quinolones per report.

### **Treatment:**

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- **IV antibiotics** started (Amikacin + Ceftazidime initially as per sensitivity).
- **Daily sterile wound dressings** (Betadine then normal saline flush) by surgical team.
- **Glycaemic optimization** and endocrinology involvement to improve healing milieu.
- **Monitoring:** Serial wound checks, temperature, WBC/CRP trends, and repeat USG if clinical deterioration. No interventional drainage or re-exploration was required because there was no intraperitoneal collection and the patient remained clinically stable.

**Outcome:** Wound discharge reduced markedly during the week; wound margins healthy. The patient was discharged home with advice of outpatient follow-up after 1 week.

### **DISCUSSION (ANALYSIS & LEARNING POINTS)**

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#### **Why did this happen?**

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- **Risk factors:** prior ERCP (instrumentation and stenting),

inflamed/frozen Calot's triangle, diabetes (poor glycaemic control, HbA1c 8.8%) - all predispose to more difficult dissection and higher risk of minor ductal injury and wound infection.

- **Mechanism of bile leak:** Likely a small injury sustained during electrocautery dissection in an inflamed field. External drainage and stent *in situ* permitted controlled external fistula formation rather than gross intraperitoneal contamination.

### Why conservative management worked

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- Controlled external fistula: Functioning drain allowed bile egress externally; no peritoneal collection or sepsis.
- MRCP confirmation: Demonstrated injury location/extent and absence of collection, supporting non-operative approach.
- The patient remained hemodynamically stable with normalizing LFTs - favored conservative therapy.
- Natural history: many low-output external biliary fistulae close spontaneously in 1-3 weeks if adequately drained and without distal obstruction.

### When would re-intervention be warranted?

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- Increasing abdominal pain, peritonitis signs, sepsis, expanding intra-abdominal collection, uncontrolled high-output fistula with metabolic compromise, or ongoing biliary obstruction - any of these would prompt ERCP re-intervention (if endoscopically treatable), percutaneous drainage or surgical re-exploration.

### Wound infection considerations

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- Diabetes increases surgical site infection risk - early wound culture and targeted antibiotics are critical. In this case, E. coli sensitive to aminoglycoside/?-lactam-inhibitor options allowed effective therapy.

### LESSONS LEARNT (PRACTICAL PEARLS)

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- Anticipate complications after ERCP + interval cholecystectomy in inflamed fields - counsel patients about

drain expectations and red flags.

- Place and maintain functioning subhepatic drainage in difficult cholecystectomies; it can convert what might be an intra-abdominal leak into a controlled external fistula.
- Use MRCP early when bile leak is suspected to localize and confirm type of injury and absence/presence of collections. MRCP is non-invasive and useful to guide management.
- Conservative management is appropriate for low-output, controlled bile leaks without collection or sepsis - avoid re-exploration unless clinical deterioration occurs.
- Manage wound infection aggressively in diabetics: early culture, targeted antibiotics, daily dressings, and optimize glycaemic control.
- Document counselling and insist on close follow-up - patient decisions to defer admission can prolong morbidity; clear communication about risks is essential.

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# 11

## Post-subtotal cholecystectomy gall stones with choledocholithiasis (Post-ERCP, stent) How did I manage?



● Prof Nagesh NS

### INTRODUCTION:

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Laparoscopic cholecystectomy is considered as gold standard for symptomatic gall stone disease. In “difficult gall bladder,” whereby severe inflammation distorts the Calot’s anatomy and obscures the ability to obtain the local anatomy, laparoscopic subtotal cholecystectomy is advised to avoid bile duct injury [1]. Completion cholecystectomy is performed for recurrent or persistent biliary symptoms following subtotal cholecystectomy or incomplete cholecystectomy.

### CASE REPORT:

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In Dec 2024 a 36-year-old female presented with cholangitis with obstructive jaundice for which she underwent ERCP and stenting by medical gastroenterologist (MGE) at a teaching medical college hospital elsewhere. Following week, she progressed to have empyema gall bladder (GB) for which she underwent percutaneous transhepatic cholecystostomy. She was managed

conservatively with culture-based antibiotics and other supportive care and was discharged. After 6 weeks, she had cholangitis and underwent ERCP and stent exchange for stent block.

Subsequently, after 6 weeks, the patient was taken up Laparoscopic Cholecystectomy at the same center. However, in view of multiple adhesions and inability to define Calot's triangle, a subtotal cholecystectomy was performed and the patient was discharged from this medical college hospital.

After three months, patient developed pain abdomen, for which MRI + MRCP was done which showed minimally distended gall bladder with multiple calculi with minimal pericholecystic free fluid with postprocedural changes. CBD was dilated with stent *in situ* and calculus of 5 x 6.5 mm in distal CBD.

With a diagnosis of retained choledocholithiasis with cholelithiasis the patient was referred to Institute of Gastroenterology Sciences and Organ Transplant (IGOT).

### **COURSE AT IGOT:**

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Patient history and imaging were reviewed. The patient was consented for ERCP followed by laparoscopic completion cholecystectomy. Dept of Medical Gastroenterology did ERC and were able to clear the CBD stone. Next day, the patient was posted for Lap Completion cholecystectomy.

### **INTRA-OPERATIVE:**

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- ❖ At induction:
  - Inj. Amoxicillin + Clavulanic acid 1.2 g IV
  - ICG. 0.5 ml diluted to 2 cc IV
- ❖ Infraumbilical 10 mm camera port was placed via open Hassan technique.
- ❖ Standard Lap Cholecystectomy ports
- ❖ Multiple adhesions between duodenum, hepatic flexure and right anterior abdominal wall were noted.
- ❖ Meticulous adhesiolysis by a combination of Cold scissors, Bipolar energy device and hydrodissection.

- ❖ After bringing down the hepatic flexure and duodenum, the remnant GB was identified with the aid of ICG. The gall bladder was defined.
- ❖ Calot's triangle dissection to identify cystic artery and cystic duct (short and wide).
- ❖ Remnant GB was opened away from the cystic duct and all the remnant stones extracted.
- ❖ Cystic duct was closed with intracorporeal suturing with 2-0 Vicryl
- ❖ ADK 28 Fr placed in GB fossa via GB retraction port.
- ❖ Postoperative period was uneventful.
- ❖ Patient was discharged on postoperative day 3.

## DISCUSSION:

As the subtotal laparoscopic cholecystectomies are increasing in numbers, number of patients requiring completion cholecystectomy is also increasing. Notably, subtotal cholecystectomy has been associated with postoperative bile leak and retained gall stones, with up to 28.7% of patients requiring interventions.<sup>1</sup>

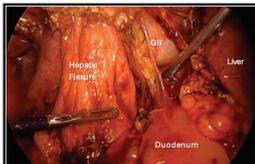


Fig. 1: Adhesion to GB

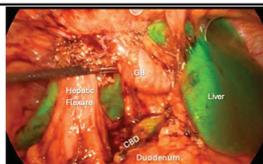


Fig. 2: ICG

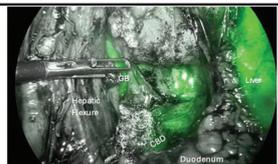


Fig. 3: ICG

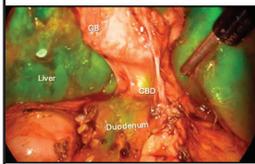


Fig. 4: ICG aided Dissection of GB from CBD

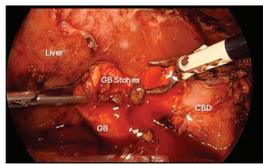


Fig. 5: Retrieval of GB Stones

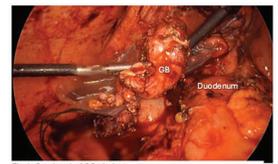


Fig. 6: Retrieval of GB via bag

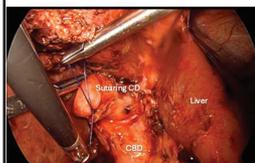


Fig. 7: Suturing CD



Fig. 8: Drain Placement

A recent systemic review showed reoperation rate of 1.8% in all patients who underwent laparoscopic subtotal cholecystectomy.<sup>2</sup> The indications for completion cholecystectomy are symptomatic cholelithiasis and choledocholithiasis. The patient with residual gall bladder remnant > 2.5 cm required completion cholecystectomy.<sup>3</sup> Initially hypothesis was the rise in incidence of subtotal cholecystectomy was due to “younger” surgeons lacking adequate experience in open cholecystectomy. But, the index surgeon’s years in practice ran the full spectrum from recent graduates to senior general surgeons with decades of experience.<sup>4</sup> Completion cholecystectomy can be done open, laparoscopically and robotically. Completion cholecystectomy is a complex operation that carries limited morbidity, when performed using minimally invasive techniques.<sup>3</sup> Laparoscopic completion cholecystectomy is feasible and safe but is technically challenging.<sup>1</sup>

## CONCLUSION:

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- ❖ Laparoscopic subtotal cholecystectomy is one of the standard bailout options but the surgeon should ensure that GB and CBD are cleared of all the stones.
- ❖ Laparoscopic completion cholecystectomy can be challenging due to adhesions & altered anatomy and must be undertaken at high volume centres by experienced laparoscopic surgeons.

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# 12

## Complication following open appendicectomy. How did I Manage



● Dr Gurushantappa Yalagachin

### **CASE HISTORY:**

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A 24 year old male presented with history of undergoing surgery with McBurney's incision for diagnosis of acute appendicitis at some other hospital. Telephonically, when the operating surgeon was contacted following information was obtained (in his own words) that the surgeon found a perforation in the ileum. He closed it and did appendicectomy (status of appendix was NOT mentioned).

The surgeon was out of station for 8-10 days immediately after surgery. When he came back (on 10th POD), the surgeon saw that there was feculent discharge with open wound in the right iliac fossa and right flank. He was then referred to us.

The details as given by patient and relatives: The patient developed a bleb to the right of operative wound on POD 5 which ruptured after 2 days (POD 7) leaving behind the wound and feculent discharge from operated wound. 3 days after feculent discharge from wound, the patient was seen by the surgeon who

operated on him. He was then sent to this institute.

There was no history of vomiting, constipation or abdominal distension. He had a history of tobacco and alcohol consumption for 3 years.

❖ USG done outside before surgery: Focal short segment area of bowel wall thickening in the right iliac fossa with dilatation of proximal bowel. Features are suggestive of infective or neoplastic etiology.

On arrival to our hospital

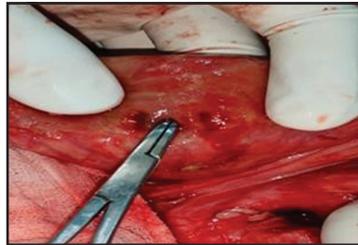
■ Vitals: Pulse rate - 120/min, BP - 100/70mmHg, afebrile. Pallor was present, B/L pedal edema was present. Per abdomen was soft with minimal distension. Feculent discharge from appendectomy wound was noted. Bowel sounds were present. A necrotic patch of size 14 x 10 cm was noted in the right flank.



Blood investigations; Hb-9.2%, TC;1800 cells/cumm, Serum creatinine was 0.6 mg%, Liver function tests were normal. Viral markers were negative.

**He underwent a laparotomy on the next day**

**Intra -op findings:** 1) 300 ml of purulent collection, adhesions between bowel loops, ileal perforation site at about 40 cm from ileocolic junction that was initially closed had given way. One more perforation of size 0.3 x 0.4 cm was noted in the distal jejunum. Stump of the appendix including the part of muscle layer was found intact. Inner aspect of parietal wall, lateral to the previous appendectomy wound was found to be sloughed off.



Opened up ileal perforation

## PROCEDURE DONE



*Jejunal and ileal segmental resection and abdominal wall debridement.*

Feculent discharge noted from appendicectomy wound with necrosis of skin around sutured area.



(2<sup>nd</sup> exploration)

❖ Feculent discharge noted from previous appendectomy wound site, with purulent discharge from laparotomy wound.

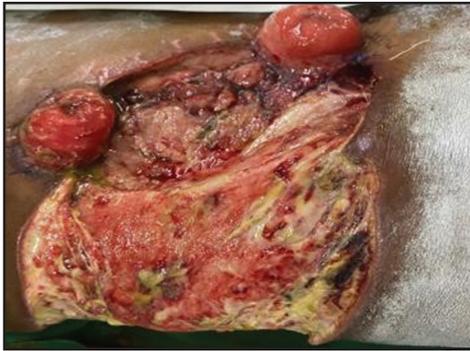
❖



### **(3<sup>RD</sup> EXPLORATION)**

**INTRA OP FINDINGS;** Feculent collection, given away ileal and jejunal anastomosis, Multiple threatened perforations noted between two anastomoses. Small bowel wall edema was noted with adhesions.

**Procedure done;** Resection of ileal segment with exteriorization of bowel loops.



v **Post-top management;** Intravenous (IV) fluids, IV antibiotics (Meropenem, metronidazole, amikacin, linezolid), multi-vitamin injection, Inj. Thiamine. Oral calcium, Vit D, iron, folic acid supplements, B complex tablets. Total parenteral nutrition, 4 units of packed cells, 1 unit whole blood and 2 units of FFP were transfused. Albumin injection (one 5% and another 20 %) RT Feed - Started on 3rd POD of 3rd exploration, Oral feeds - Started on 5th POD. Central venous line was changed from right subclavian to sight IJV after 18 days.

### **NUTRITIONAL SUPPORT;**



On 12th post op day, the patient's vitals were stable, He was taking oral regular high protein diet, sitting without support ambulating with support, functioning stoma with output of 1200-1500 ml/day,

**output. Blood parameters as follows:**

Parameters	Hb	TC	TP	ALB	RFT	SE
values	10.1	12.9	6.2	2.8	26/0.7	130/3.8

on 13th post op day.

The patient collapsed when he tried to ambulate, O/E- Pulse and oxygen saturation were not recordable. Blood pressure was not recordable. RBS - 203 mg/dl. The patient was given CPR, IV fluids. Endotracheal intubation was done. After two cycles of CPR, he was successfully resuscitated. The patient was shifted to ICU, put on mechanical ventilator with inotropic support. Hours later, he had multiple cardiac arrests and succumbed.

**LESSONS LEARNT:**

- ❖ If pre-op diagnosis is uncertain, should one operate on appendix? No.
- ❖ Operating on intestine and going out of station? Complications are unpredictable sometimes.
- ❖ Would have done diversion in the 1st exploration itself

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# 13

## Chronic Sinus After Abscess Drainage-An Unexpected Cause How did I manage?



Dr. Naaz Jahan Shaikh

### CASE REPORT :

A 20 year old girl presented with history of fever of two weeks duration along with pain in right iliac fossa (RIF). On examination she had tender ill-defined mass in the right iliac fossa. USG showed presence of an abscess in R.I.F, most probably due to ruptured appendix. A CECT (Contrast Enhanced CT) was done to confirm the diagnosis. She was posted for abscess drainage. Though she was relieved of fever and pain after the procedure, the discharge continued for more than 6 months. We tried a trial of various antibiotics but the sinus refused to close. Scrapings from the wound were sent for HPE and PCR- DNA testing for mycobacteria. It was negative. We finally decided to do another CT examination and a C.T sinogram. The radiologist called and said that there is a foreign body, maybe a needle like object. There were two metal pieces one by the side of caecum and another in the paraspinal muscle. I tried imagining how I could have left the needle in a procedure which was just a simple abscess drainage!

We reviewed the previous C.T and to our astonishment they were very much present which we had overlooked. We also did a plain X-Ray, for ease to operate during a C- Arm use, which showed the two foreign bodies.

### **WHAT DID I DO?**

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We explored the wound with both anterior and posterior approach, with the help of C-Arm. We could extract the needle pieces, without any postoperative complications. The patient had an uneventful recovery, and the wound healed by the next 10 days.

### **DISCUSSION:**

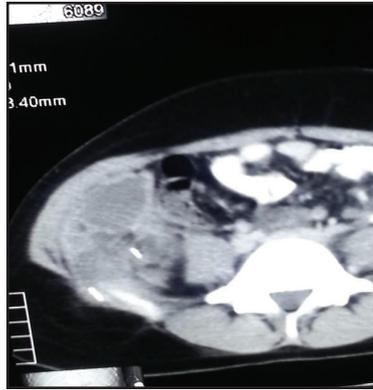
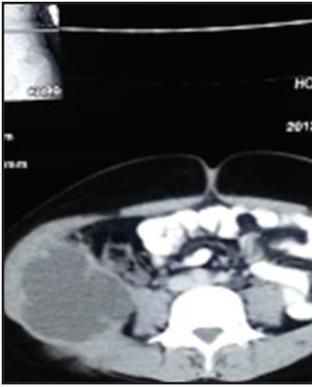
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The patient had a foreign body which caused the process of infection. It must have been a needle, accidentally swallowed and forgotten which has left the G.I. domain to lodge itself in the places mentioned. With constant movement it has probably broken and extended to the second place. We were relieved that they were present in the initial C.T. and that, it was not a retained foreign object (RFO) after surgery.

### **LESSONS LEARNT:**

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1. Thorough pre-op investigation to plan the proper treatment is essential
2. Viewing of films and reports must be done with an open mind. A careful view would have directed us towards the foreign body
3. It is important that we, as surgeons ask for the soft copy and view the images ourselves, on a computer screen for a better clarity of the plan
4. Quite often, what we consider as a simple case can be complex and pose challenges. This is one such incident which I would like to share.





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# 14

## Retained abdominal pigtail catheter How did I manage?



● Dr. Vijayendra Kedage

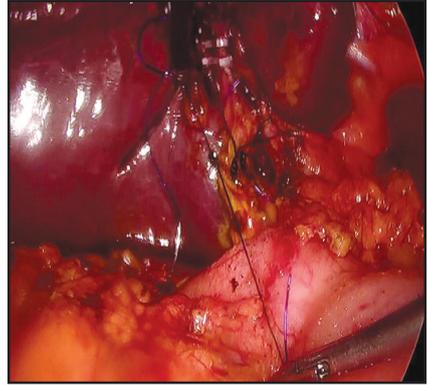
### CASE REPORT

55 year old hypertensive male patient underwent interval laparoscopic cholecystectomy for symptomatic cholelithiasis with H/O acute cholecystitis. The procedure was converted to laparotomy in view of bleeding from the gall bladder (GB) fossa. An iatrogenic bile duct injury on the lateral wall (Type D) was noted. The bleeding was controlled and bile duct repair done with interrupted 2-0 PDS sutures. An abdominal drain was placed in the subhepatic space.

- Postoperatively there was persistent biliary drainage from the abdominal drain and hence an ERCP and bile duct stenting was done on POD4. The patient had abdominal pain and distension with USG showing significant perihepatic and subhepatic collection. Hence a USG-guided Malecot's catheter (8 Fr) was done.

Subsequently patient was discharged with the catheter and reviewed after 1 month with minimal drain output, when a repeat

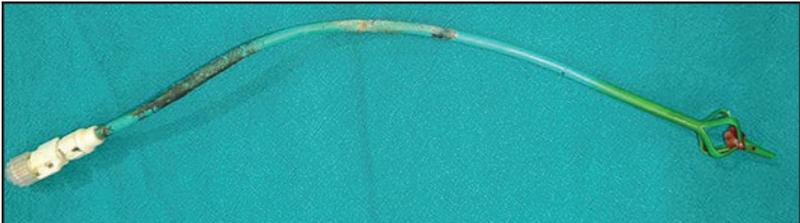
USG was done which showed no residual collection. Removal of the Malecot's catheter was attempted in the OPD but failed.



### **WHAT DID WE DO ?**

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- Review USG was done to look for position of the tip of the catheter, which showed to be in GB fossa.
- A weight of 500 ml NS bottle was attached to the catheter and the patient was asked to come for review after one week.
- The patient was reviewed after a week and USG guided removal was attempted but failed.
- So, the patient underwent diagnostic laparoscopy and retained Malecot catheter removal



### **DISCUSSION**

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Retained intra-abdominal foreign body, though rare, happens, with symptoms occurring from days to years after the original

operation. Most estimates range between 1/1,000 to 1/1,500 laparotomies, and this figure may be an underestimation because not every incident is reported for fear of legal problems. Most are retained unknowingly, or if the drain is fractured and retracted intraperitoneally because they were curled, sutured loosely with an unsecured knot, or overstretched if any excessive force was used during its removal. Leaving them for any period of time allows for tissue in-growths around the drain and side holes, causing severe resistance on removal, with eventual breakage and retention.

## LESSONS LEARNT

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1. Avoid prolonged indwelling abdominal drains
2. Laparoscopic retrieval is the best option in case the drain is not able to be removed in the OPD.

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# 15

## Anastomotic leak due to intraluminal migration of pelvic drain, after colonic resection: How did I manage?



B Srinivas Pai

### CASE REPORT

A 60-year-old male with acute large bowel obstruction due to rectosigmoid carcinoma and liver metastases underwent resection of the sigmoid colon and upper rectum with side-to-end colorectal anastomosis. A 32F chest tube was placed as a passive pelvic drain. Oral intake was started on postoperative day (POD) 4, and stools were passed on POD 5. On POD 6, feculent drain output (150–200 ml) was noted, and CT abdomen confirmed a low-output anastomotic leak. The drain was retained, oral feeding continued, and output gradually reduced. On PODs 14–15, the patient developed sudden constipation. Per rectal examination and proctoscopy revealed intraluminal migration of the drain. He was posted for re-exploratory laparotomy without further investigations. Laparotomy revealed migration of the pelvic drain through the anastomotic line into the rectal lumen, with an associated fistulous tract and adherent small bowel loops. The drain tip was palpable per rectum (Figure 1). The drain was

removed, the fistulous tract excised, the anastomotic defect closed, and a diversion loop ileostomy was performed. Oral intake was resumed on postoperative day 1, and the patient was discharged on day 7 with a healthy stoma. Histopathology showed well-differentiated adenocarcinoma (pT4aN1bM1, stage IV) with negative margins. The patient declined further treatment and later succumbed to the disease.



Figure 1

## DISCUSSION

The use of prophylactic drains following colonic surgery remains controversial, with most contemporary guidelines discouraging their routine use. This represents a change in basic assumptions from Lawson Tait's dictum, "When in doubt, drain," to the modern principle of avoiding drainage when uncertain. Nevertheless, drains are still widely used and are associated with complications such as sepsis, vascular injury, adhesions, and drain migration. Drain migration is reported more frequently in upper gastrointestinal surgery than in colorectal procedures, although the exact mechanism remains unclear. In suction drains, adherence to the bowel wall may cause ischemia and perforation, leading to intraluminal migration. Factors such as inadequate fixation, drain flexibility, visceral peristalsis, and patient movement may contribute. Persistent postoperative drainage warrants radiologic and endoscopic evaluation to differentiate anastomotic leakage from drain migration. Non-operative management may be considered after excluding fistula formation.

## LEARNING POINTS

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- Consider intraluminal drain migration in cases of persistent or increased drain output.
- Drain placement is surgeon-dependent and does not affect overall outcomes.
- Migrated drains may be managed conservatively or surgically.
- Always rule out fistula formation before nonoperative management.

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# 16

## HYPOCALCEMIA POST PARATHYROID ADENOMA EXCISION : How did I manage?



● Dr. S S Prasad

### CASE REPORT

71 year old, hypertensive male presented with polyuria, polydipsia, lethargy and mood disturbance for 3 months and difficulty in walking for 3 days. On evaluation, serum calcium level was 16.2 mg/dl with parathyroid hormone level of 1415 ng/ml. He also had Vitamin D deficiency and acute kidney injury.

He was managed initially for hypercalcemia with intravenous fluids, calcitonin and zoledronate injections and serum calcium reduced to 9 mg/dl. Ultrasound neck and Technetium 99 Sestamibi scan showed right inferior parathyroid adenoma. Patient underwent right parathyroid adenoma excision under general anaesthesia. Intraoperatively, 3.5 cm X 1.5 cm adenoma was present inferior to right lobe of thyroid. Recurrent laryngeal nerve on the right side was identified and preserved (Figure 1).

Intraoperative parathyroid hormone (PTH) was measured 10 minutes post-adenoma excision which showed reduction to 355 ng/ml which was in concordance to **Miami criteria**. In the

immediate postoperative period, the patient had severe hypocalcaemia with perioral numbness and tingling sensation. Chvostek and Trousseau signs were positive (Figures 2 and 3).

### WHAT DID I DO

Investigations were done to check serum albumin and magnesium levels, which were normal. He was managed with Injection Calcium gluconate 10 %, 10 ml slow IV thrice daily with oral calcium carbonate and calcitriol supplementations. Calcium levels normalised gradually and was switched to oral supplements only and discharged.

	Pre-op	POD 1		POD 2		POD 3	POD 4
<b>Calcium (mg/dl)</b>	16.5	7.5	7.8	7.7	7.8	8.3	9.0
<b>PTH (ng/ml)</b>	1415	355		99		40	

POD: Postoperative Day



Figure 1 Adenoma specimen      Figure 2 Trousseau sign post op



Figure 3 Trousseau sign post op

## DISCUSSION

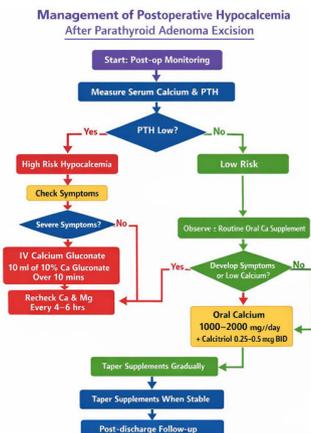
Incidence of permanent hypocalcemia following a solitary parathyroid adenoma is rare which is around 0.8 to 3 percent. Transient hypocalcemia is more common which is managed with oral and intravenous calcium supplements.

**Monitoring in the immediate postoperative period: Serum calcium and PTH** at regular intervals (e.g., 6–12 hours initially), as well as a watch for symptoms of hypocalcemia aid early detection of **hypocalcaemia** as in our case.

**Post-op Hypocalcaemia: Transient hypocalcaemia** is common after adenoma removal due to suppressed normal glands. “Hungry bone syndrome” (especially in patients with severe pre-op bone disease or giant adenomas) results in sudden increase in osteoblast activity and rapid calcium uptake by the bones.

### Management Protocol

- **Asymptomatic mild hypocalcaemia** : Oral calcium (e.g., calcium carbonate) and Vitamin D analogues (e.g., calcitriol)
- **Symptomatic or severe hypocalcaemia: IV calcium** (e.g., calcium gluconate) infusion and transition to oral therapy once stable
- **Hungry Bone Syndrome:** Higher doses of calcium, Active vitamin D, Monitor magnesium; correct deficiencies



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## WHAT I LEARNT

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Early clinical identification of postoperative hypocalcemia post parathyroid adenoma excision of paramount importance.

Correlation of serum calcium levels with serum albumin and magnesium levels is also vital in identification of pseudohypocalcemia and refractory hypocalcemia.

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# 17

## Postoperative paralytic ileus following sigmoid colectomy - What happened and how did I manage?



● Prof Nagesh NS

### CASE HISTORY

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A 71 year old gentleman with diabetes mellitus for the past 20 years, hypertension for 10 years and gout for 10 years presented with left lower abdominal colicky pain on and off for the past 2 weeks associated with loose stools. No h/o loss of appetite and no h/o loss of weight. Clinical examination was unremarkable except for the left iliac fossa tenderness.

### INVESTIGATIONS:

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With a clinical diagnosis of diverticular disease, a full length colonoscopy was done which showed 4 x 4 cm ulcero-proliferative growth in the sigmoid colon extending for about 5 cm and causing up to 50% of luminal occlusion. Biopsy of lesion was suggestive of adenocarcinoma. CECT showed short segment wall thickening involving proximal sigmoid colon T2N0M0.

**PRE-OPERATIVE PHASE:**

Patient was posted for laparoscopic anterior resection. Bowel preparation was by COLOPREP was administered on the previous evening following which the patient had colicky abdominal pain with 3 episodes of vomiting of the ingested fluid. This was associated with abdominal distention at 10 PM. Pain settled with Inj Drotaverine. From 3:00 AM to 6:00 AM, the patient had 8 to 10 episodes of loose stools with last few being completely watery - suggestive of effective bowel preparation.

**OPERATIVE PHASE:**

The patient was taken up for radical laparoscopic anterior resection with low ligation of inferior mesenteric vein pedicle. The specimen was delivered via Pfannenstiel's incision. Extracorporeal anastomosis of descending colon to mid-rectum (side to end) was performed using 31 circular stapler. 32 Fr drain was placed in the pelvis via right flank. Duration of surgery was 6 hours. Estimated blood loss < 50 ml.

**POST-OPERATIVE PERIOD:**

POD 1 &2	<ul style="list-style-type: none"><li>• Uneventful</li></ul>
POD 3	<ul style="list-style-type: none"><li>• Oral clear liquids started. Electrolyte correction</li><li>• The patient had severe lower abdominal pain in the night, out of proportion to the operative pain associated with mild lower abdominal distension.</li><li>• Bowel sounds absent</li><li>• Tachycardia of 102 bpm. BP and WBC: WNL</li></ul>
POD 4	<ul style="list-style-type: none"><li>• NPO, Ryle's Tube inserted and supportive treatment was started.</li><li>• Lower abdominal pain gradually decreased.</li><li>• Drain had 580 mL serous fluid - ? Due to extensive lymphatic dissection.</li><li>• Patient started on Tab Lacilactone.</li></ul>

POD 5	<ul style="list-style-type: none"> <li>• Minimal abdominal pain with mild distension persisted.</li> <li>• ABG: Lactate 1.5 mg/dL (previously 1.2 mg/dL)</li> <li>• Rectal Contrast CT done which showed no leak.</li> <li>• Bowel sounds present. Passed flatus</li> </ul>
POD 6	<ul style="list-style-type: none"> <li>• Patient continued to have lower abdominal pain.</li> <li>• Inflammatory markers: CRP and procalcitonin elevated.</li> <li>• Ryles tube output 530 mL of bilious output.</li> </ul>
POD 7	<ul style="list-style-type: none"> <li>• Repeat rectal contrast CT - No leak.</li> <li>• Hence a diagnosis of sub-clinical leak was made and the patient was managed with supportive care accordingly.</li> <li>• Bowel sounds were present.</li> <li>• After patient started passing flatus, he was started on liquid diet</li> </ul>
POD 8	<ul style="list-style-type: none"> <li>• Patient passed stool 4-5 times.</li> <li>• Distension decreased.</li> <li>• Continued liquid diet</li> </ul>
POD 9	<ul style="list-style-type: none"> <li>• Drain output 100mL</li> <li>• Ryle's tube removed. Continued liquid diet.</li> </ul>
POD 10	<ul style="list-style-type: none"> <li>• Started on soft diet.</li> </ul>
POD 12	<ul style="list-style-type: none"> <li>• Drain removed and discharged</li> </ul>

### HPE REPORT:

Tumour size of 4.5 x 4.0 x 1.0 cm moderately differentiated Adenocarcinoma (G2). Proximal, Distal and Mesocolic margins free of tumour. Proximal and distal donuts free of tumour. Regional lymph node free of tumour cells (0/28) No tumour perforation. No lymphovascular invasion. Perineural invasion present. Tumour budding score low. IHC: Negative for MLH1, MSH2, MSH6 and PMS2.

**ADJUVANT CHEMOTHERAPY:**

Patient was referred to medical oncologist for role of adjuvant chemo (if any).

**TAKE HOME MESSAGE:**

- A. Anastomotic leak is not always obvious and can occur as early as 3rd POD and even after 30th POD as in this case.
- B. In any postoperative colectomy patient, lower abdominal pain which is out of proportion to expected post-op pain in conjunction with tachycardia, should raise the suspicion of anastomotic leak (AL). Elevated inflammatory markers such as CRP and procalcitonin along with lactates aid in diagnosis of AL. The cutoffs for CRP and Procalcitonin are as follows:

CRP	POD 3	POD 4	POD 5	Inference:
Lap	<172mg/L	<124mg/L	<144mg/L	Negative Predictive Value of 97%
Open	>209mg/L	>123.4 mg/L		

	POD 3	
<b>Procalcitonin</b>	<2.7 ng/mL	Negative Predictive Value of AL: 96.9%
	<2.3 ng/mL	Negative Predictive value of AL: 98.3%

**C. Confirmatory Test:**

CECT with oral and/or rectal contrast is the investigation of choice to confirm AL

Signs:

- Leak with free air
- Extravasation of contrast from bowel

- Defect in anastomotic site with adjacent free fluids or abscess
  - Rim enhancing fluid collection
  - Specks of free air adjacent to anastomotic site
- D. Subclinical / sealed off leak should be kept in mind in cases where in biochemical parameters are elevated but imageology is negative - as in this case.

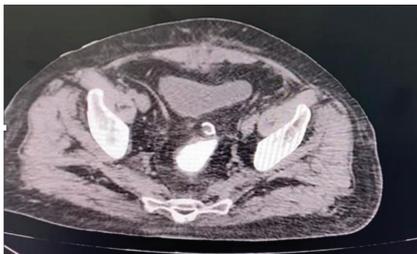
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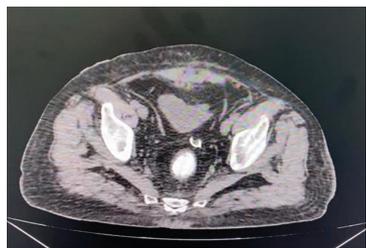
Sigmoid colon



*Figure 1: Colonoscopy - Growth in Sigmoid Colon*



*Figure 2: CT with Rectal Contrast (POD 3)*



*Figure 3: Rectal Contrast CT (POD5)*

# 18

## Fecal fistula following ileocecal resection How did I manage?



● Prof Ashok Godhi

### CASE REPORT:

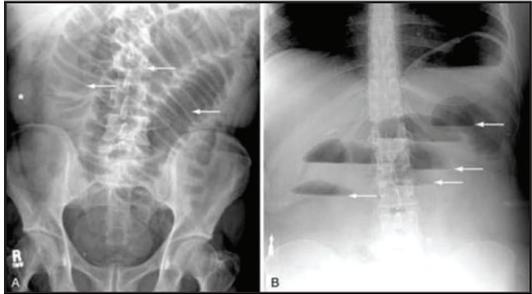
A 58 year old male, previously in good health, developed constipation 3 months back, for which he was treated with enema. After 15 days, he developed acute severe abdominal pain. On physical examination, there were signs of peritonitis in the right lower quadrant. Imaging investigations showed collection in the right iliac fossa (RIF) - ? appendicular perforation.

Emergency exploratory laparotomy revealed fecal peritonitis due to caecal perforation. Limited ileo-caecal resection and end to end ileum to ascending colon anastomosis was performed. Histopathologic report (HPR) showed nonspecific perforation. He was readmitted twice for abdominal pain and purulent discharge from the drain site.

Two months later he was referred to KLE Dr. Prabhakar Kore Hospital and Medical Research Centre, Belagavi for abdominal pain and distension.

## WHAT DID I DO?

Plain x-ray showed multiple air fluid levels. Chest X-ray was normal. Blood examination revealed leukocytosis - 12500 cells/cumm, with 80% polymorphs, urea 35 mg%, creatinine 1.6 mg%, sodium 135



mmol/L, potassium 3.5 mmol/L. Subacute intestinal obstruction due to adhesions was suspected. He improved with enema, intravenous fluid, antibiotics and 'nil by mouth'. On the third day of admission, there was profuse fecal discharge from the drain site in the RIF.



Anastomotic leak was diagnosed. Fistulogram showed enterocutaneous fistula with intra-abdominal extravasation of dye. The dye entered the terminal ileum and ascending colon.

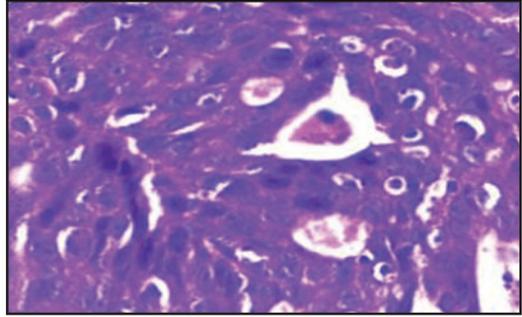
Under general anesthesia, the drain wound was explored to provide wide drainage and a wide bore tube was inserted to convert it into controlled fistula. Fecal discharge reduced.



CT showed diffuse wall thickening, but no abnormal enhancement at the ileum to ascending colon anastomosis. Rectal contrast reached up to splenic flexure. Diffuse mesenteric fat stranding -post op. No

ascites. Bilateral minimal pleural effusion was present.

Colonoscopy showed ulceronodular circumferential growth in the hepatic flexure causing luminal



narrowing. Biopsy revealed moderately differentiated adenocarcinoma

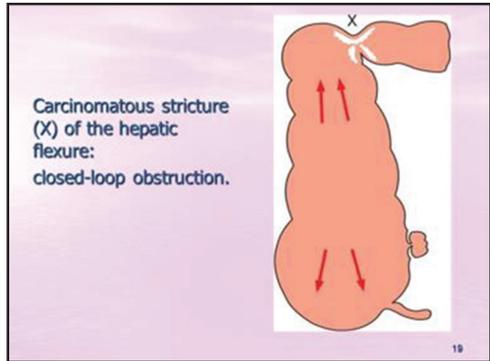
Right radical hemicolectomy, end to end ileo-transverse colon anastomosis was performed. The specimen showed exophytic growth narrowing lumen of the colon. HPR-moderately differentiated adenocarcinoma, infiltrating up to outer longitudinal muscle layer; serosa was not involved. Vascular emboli and perineural invasion were present. Surgical margins were free. Lymph nodes- reactive hyperplasia. AJCC classification-T2 N0 M0. AJCC- grade 2.

Adjuvant FOLFOX was administered.

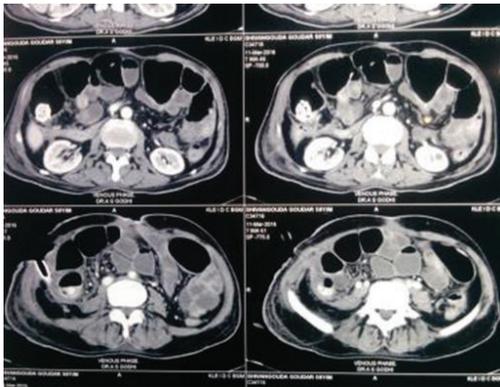
## DISCUSSION:

**Clinicopathological sequence of events:** The growth was incompletely obstructing the colon at the hepatic flexure causing constipation. When the fecal impaction resulted in complete

obstruction, the competent valve at the ileocecal junction permitted forward flow of fecal matter and gas into the cecum and ascending colon and prevented its backward regurgitation into the ileum, causing increase in the intracolonic pressure and



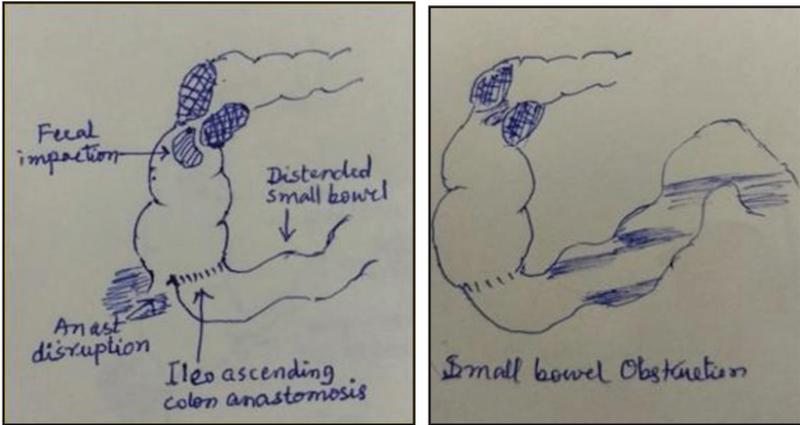
progressive distension of cecum and ascending colon. The brunt of the increasing pressure was borne by the cecum. The cecum ballooned, the cecal wall thinned out and the intramural blood vessels got obliterated causing ischemic perforation and fecal peritonitis. This is a typical case of closed loop obstruction. If the ileocecal valve is incompetent, the fecal matter regurgitates into the terminal ileum and the pressure in the colon does not increase and the cecum does not perforate.



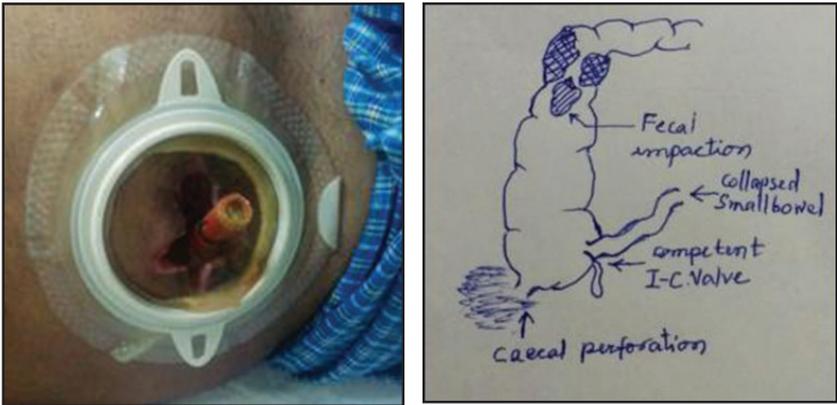
At exploration, when the caecal perforation was found, limited ileocaecal resection and ileo-ascending colon anastomosis was carried out. The patient recovered. Over the next

two months, the growth further progressed and resulted in near complete obstruction at the hepatic flexure. In the absence of ileocaecal valve the obstruction had spread to the small bowel; the x-ray showed features of small bowel obstruction and adhesive intestinal obstruction was suspected and conservatively treated. In the presence of distal obstruction the anastomosis gave way resulting in fecal fistula.

Colonoscopy detected the growth in the hepatic flexure which was the root cause for the sequence of events.



Common causes of caecal perforation are distal colonic obstruction, pseudo-obstruction. Rare causes are amoebic



typhlitis, ulcerative colitis/Crohn's, carcinoma cecum, tuberculosis.

Common causes of anastomotic leak are ischemia, tension, diseased bowel, distal obstruction. General causes are anemia, hypoproteinemia, steroids, cachexia and others.

**LESSONS LEARNT:**

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1. Appendicitis can be a manifestation of carcinoma caecum. Also, caecal perforation can be due to closed loop obstruction or distal obstruction, may be a growth in hepatic flexure.
2. If a growth is found, following are the options depending on the condition of the patient. Most of them need multidisciplinary approach - Biopsy and Ileostomy. Investigate, optimize, stage and decide further line of treatment - Hemicolectomy and primary anastomosis/ileostomy.

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# 19

## Anal Stenosis Following Open Hemorrhoidectomy How did I manage?



● Vijayendra Kedage

### CASE REPORT:

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A 39 year old male had undergone open hemorrhoidectomy at another hospital 1 month ago. He presented to our OPD with history of painful defecation and continued bleeding per rectum since the surgery. He had received multiple blood transfusions at the same hospital. On per rectal examination, there was skin loss circumferentially around the anal verge extending to anal canal. Oozing was visible externally and anal sphincter tone was increased with tenderness.

### INVESTIGATIONS:

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All routine investigations were done and were within normal limits.

### HOW WE MANAGED:

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Patient was managed conservatively with analgesics and local antibiotic application and laxatives. His pain and bleeding



Figure 1: Plastic Anal Dilators

subsided and the patient was advised serial dilatation with plastic anal dilators (Figure 1). Anal dilation was done serially, starting with the lowest diameter of anal dilator with adequate lubrication.

Patient was discharged with laxatives and advised sitz bath. At 1 month follow up, his symptoms of painful defecation had improved. On per rectal examination, the sphincter tone had returned to normal. He was advised to continue anal dilation for 5 more months. At 6 months review, patient was symptom free, with no evidence of anal stenosis. He has been followed up at 1 year and has no permanent anal stenosis.

## DISCUSSION:

Anal stenosis following open hemorrhoidectomy is a serious, but rare complication.<sup>1</sup> The incidence is around 5% following the surgery.<sup>2</sup> It occurs particularly in patients in whom large areas of anoderm and hemorrhoidal rectal mucosa from the lining of the anal canal is denuded.<sup>3</sup> The classification of anal stenosis was made by Milsom and Mazier as given in Table 1.<sup>4</sup>

Table 1.4 Classification of anal stenosis	
<i>Mild</i>	<i>Stenotic anal canal can be examined by a well-lubricated index finger</i>
<i>Moderate</i>	<i>Forceful dilatation is required to do digital rectal examination</i>
<i>Severe</i>	<i>Digital rectal examination is impossible</i>

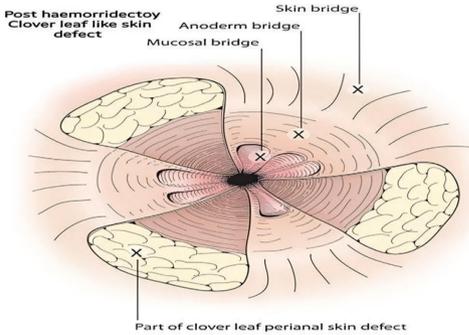


Figure 2 : Post hemorrhoidectomy skin bridges

Mild cases can be managed with laxatives. Moderate to severe cases might require anoplasty or sphincterotomy. However, conservative management is the initial treatment of choice.

## LESSONS LEARNT:

- Prevention is better than cure. Handle tissues delicately, use absorbable suture materials. Remove only the largest and symptomatic hemorrhoidal masses if there are circumferential hemorrhoids. Alternatively staged procedure can always be done
- Always keep skin bridges in open hemorrhoidectomy to prevent stenosis (Figure 2)
- Consider stapled hemorrhoidopexy for larger hemorrhoids.
- **If it looks like a clover, your trouble is over. If it looks like a Dahlia, it is sure to be a failure.**

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# 20

## Anal Stenosis following open haemorrhoidectomy - How did I manage?



Dr. Sunil Krishna M

### CASE REPORT:

A 57-year-old male, nil premorbid, presented with complaints of constipation and passing thread-like stools since 6 months. The patient had undergone an open haemorrhoidectomy procedure at an outside hospital 7 months back.

On digital rectal examination: Increased anal tone was noted. Scar with fibrosis noted at 6 o'clock to 11 o'clock. No palpable mass. Only tip of index finger admissible into the anal opening. Sigmoidoscopy showed normal mucosal study. The patient was initially managed with conservative approach with high fibre diet, laxatives and anal dilatation. However, there was no significant improvement of the symptoms.

### WHAT DID I DO?

The patient was taken up for anal dilation with diamond flap anoplasty under spinal anesthesia. Intra-operatively severe anal

stricture was noted with circumferential scar, predominantly on the right side from 6 to 11 o'clock position.

Scar division: - A radial incision was made from dentate line to mucocutaneous junction at 6 to 11 o'clock - Full-thickness release of fibrosed anoderm and subcutaneous tissue ensuring internal sphincter was NOT divided (Figure b).



(Figure a)



(Figure b)

Diamond flap design (right posterolateral):- Base: Healthy perianal skin lateral to scar- Apex: Directed toward dentate line - Width: 2.5 cm | Length: 3 cm (diamond shape) (Figure a, Figure b) ; Flap raised in subcutaneous plane (preserves vascularity) (Figure c)



(Figure c)



(Figure d)



(Figure e)

Flap mobilization: Dissection done up to dentate line ; Tension-free advancement done into anal canal (Figure c)

Inset and closure: Flap apex was sutured to dentate line with 3-0 polyglactin by a simple interrupted closure (Figure d). Lateral edges also approximated margins of released scar ensuring no dead space (Figure e). Hemostasis confirmed.

In the postoperative period, the patient was continued on laxatives and anal dilator for 2 months. On follow up, flap was healthy, patient was able to pass normal stool and got good functional outcome.

## DISCUSSION:

Anal stenosis is a recognized complication of hemorrhoidectomy, with incidence ranging from 3.8% to 8.4% in open procedures, especially when >3 cm of anoderm is excised.<sup>1</sup> This case exemplifies severe fibrotic stenosis following open hemorrhoidectomy, leading to functional obstruction.

### Etiopathogenesis and Risk Stratification

The primary driver is loss of anoderm >3 cm during excision, triggering exuberant fibrosis and circumferential contraction as identified in Garg et al. (2023) meta-analysis:<sup>1</sup>

Risk Factor	Odds Ratio (95% CI)	p-value
Open vs Closed Technique	4.2 (2.8-6.3)	<0.001
Anoderm excision >3 cm	7.1 (4.9-10.2)	<0.001
Non-absorbable sutures	3.6 (1.9-6.8)	0.002
Postoperative constipation	2.9 (1.7-5.0)	0.01

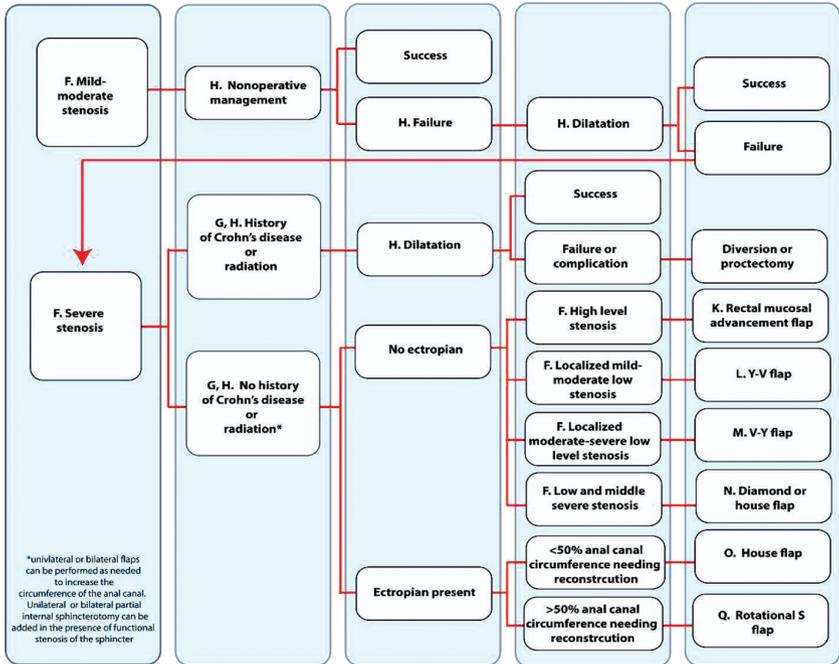
In this patient, all four risk factors were likely present: open surgery, wide excision (inferred from scar extent), possible non-absorbable suture use (outside center), and delayed presentation with chronic straining.

Surgical rationale: - Conservative therapy (dilators, stool softeners) failed due to non-compliance.

### Why Diamond Flap?

Lee et al. (2024) advocate island advancement flaps for:

1. Vascularized anoderm replacement? prevents restenosis
2. Tension-free inset -> flap survival >95%
3. Preserves sphincter -> continence intact (Vaizey score 0 at 3 months)<sup>3</sup>



Emile et al. (2022) Delphi consensus recommends flap anoplasty as first-line for severe low annular iatrogenic stenosis - validated in this case<sup>[4]</sup>

### Outcome Analysis

- **Functional:** Complete resolution of obstructive defecation syndrome (ODS) symptoms
- **Anatomic:** Calibre restored (index + middle finger at 3 months)
- **Histology:** Benign fibrosis - rules out Crohn's, malignancy
- **Continence:** Vaizey score 0 (no leakage, no pad use)

### LESSONS LEARNT:

#### 1. Prevention > Cure:

- > Limit anoderm excision to <2 cm total
- > Use absorbable 3-0 polyglactin in primary hemorrhoidectomy
- > Avoid wide bridging between piles

## 2. Early Intervention:

- > Stenosis symptoms >3 months ? refer for anoplasty
- > Conservative Rx only for mild/moderate cases

## 3. Patient Partnership:

- > Dilator compliance = single strongest predictor of success
- > Teach on POD 7-10, review weekly for 1 month

## 4. Surgical Decision-Making:

- > Anoplasty > dilatation in severe fibrosis
- > Unilateral diamond for focal scars; reserve house/S-flap for diffuse scars

## CONCLUSION

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This case validates diamond flap anoplasty as a safe, effective, reproducible solution for severe post-hemorrhoidectomy anal stenosis. With >90% success, minimal morbidity, and preserved continence, it should be the standard of care in tertiary colorectal units. Prevention through refined surgical technique remains the ultimate goal.

- Anoplasty is the gold standard for severe fibrotic stenosis
- Delay in surgery risks incontinence or perforation.

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# 21

Invited article  
Clinical wisdom

## Diabetic Foot with Fungal infection: Think Globally, Act Locally



Prof Ashok Kumar KV

### CLINICAL HISTORY:

- ◆ A 59 year old gentleman, a known diabetic, presented with trophic ulcer over plantar aspect of left great toe since 2 years, A non-healing ulcer over medial side of right heel since 10 days followed by trauma, with loss of sensation over the toes.
- ◆ O/E along with above findings, there were unhealthy nails which were not correlating with diabetic foot



*Trophic ulcer over the  
plantar aspect of left great  
toe*



*Ulcer over the medial side  
of right heel*



*Unhealthy nails  
Fungal infection?*

**HOSPITAL COURSE:**

- ◆ After initial blood tests and X-ray foot, he was diagnosed to have diabetic foot with osteomyelitis of distal phalanx of left great toe. He underwent debridement and disarticulation of distal phalanx of left great toe under local anaesthesia
- ◆ The wound was left open and planned for secondary suturing after three days



*POD 2: L. Great Toe Distal phalynx disarticulated*



*POD 2: R. heel debridement*

- ◆ Dermatologist opinion sought for the unhealthy nails
- ◆ Subungual debris sent for fungal staining
- ◆ Active searching of other lesions of the body done and found to have extensive lesions of the axilla, waist, back and bilateral inguinal region



Lesion over the right axilla



Lesion around the right shoulder

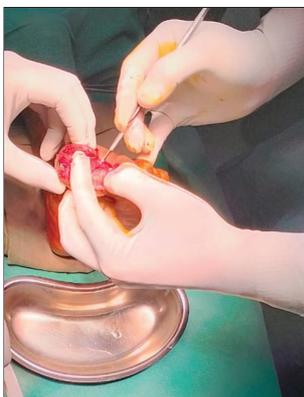


Lesion over right groin



Lesion over the waist

- ◆ He underwent secondary suturing along with nail excision of right great toe and sent for fungal culture and sensitivity



- ◆ Two possibilities were made by Dermatologist
  - ◆ 1. Fungal infection of nails and skin lesions (T. corporis)
  - ◆ 2. Psoriasis
- ◆ Scrapings of subungual debris and other skin lesions were sent for KOH examination
- ◆ Since both were treated differently, waited for preliminary report of KOH mount
- ◆ Very occasional budding yeast cells noted in subungual debris.
- ◆ So, subungual debris with nail bits were sent for culture.
- ◆ Meanwhile treatment started by Dermatologist based on preliminary report
- ◆ Dermatologist advice
  - ◆ DK gel application daily after bath over the lesions after bath
  - ◆ Amorilfine cream daily application 1 cm around the borders in the evening
  - ◆ Tab Zimig 250 mg daily once for 20 days
  - ◆ Tab Allegra 180 mg once daily in the evening for 15 days
  - ◆ Abzorb powder to be sprinkled over lesions and all flexors during evening after cream application



POD 7

- ◆ For Diabetic foot management, he was treated with
  - ◆ Inj Ceftriaxone 1g IV 1-0-1
  - ◆ Inj Metrogyl 100 ml IV 1-1-1
  - ◆ Inj Alcomax 1 amp in 100 ml saline 0-1-0
  - ◆ Tab Pan 40 mg 1-0-0 before food
  - ◆ Tab Vit C 1-1-1
  - ◆ Tab Complamina Retard 500 SR 1-0-1
  - ◆ GRBS thrice daily (1 - 1 - 1)
  - ◆ Inj Human Actrapid Insulin according to sliding scale
- ◆ He was discharged after 2 weeks with following advice
  - ◆ Tab Ciprofloxacin 500 mg 1-0-1 for 3 days
  - ◆ Tab Pan 40 mg 1-0-0 for 5 days



- ◆ Tab Vit C 1-1-1 for 15 days
- ◆ Tab Complamina retard 500 SR 1-0-1 15 days
- ◆ Tab Glycomet GP2 1-0-1 for 15 days
- ◆ Tab Istamet 50/500 1-0-1 for 15 days
- ◆ DK gel application after bath over the lesion
- ◆ Amorilfine cream beyond 1cm of borders
- ◆ Abzorb powder over the lesion and flexors evening
- ◆ Waiting for the fungal culture report
- ◆ Skin lesions significantly improved after 2 weeks of topical and systemic antifungal therapy.

### **TAKE HOME MESSAGE:**

- On the background of diabetes presenting with trophic ulcer and non-healing ulcer of foot and deformed nails, there should be strong suspicion of fungal infection.

- Actively search for other lesions over the body.
- Dermatologist and plastic surgeon expertise highly recommended.

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## KSC ASI State Executive Committee Members 2025



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Post-operative complications remain one of the most challenging and humbling aspects of surgical practice. Despite advances in technology, refined techniques, and enhanced peri-operative care, complications continue to test a surgeon's judgment, resilience, and commitment to patient safety. Acknowledging, analysing, and learning from these events is the true hallmark of surgical maturity.



This unique book on post-operative complications, thoughtfully compiled under the stewardship of Dr.K. Rajgopal Shenoy, Chairman of the Karnataka Chapter of the Association of Surgeons of India, addresses a critical yet often under-discussed domain of surgery. Rather than viewing complications as mere adverse outcomes, this work approaches them as powerful teachers—opportunities for reflection, improvement, and professional growth.

The strength of this volume lies in its practical orientation. By drawing upon real-world experiences, evidence-based insights, and collective surgical wisdom, the book provides valuable guidance on prevention, early recognition, and effective management of complications across surgical specialties. It encourages transparency, honest self-audit, and a culture of learning—principles that are essential for advancing safe surgical care.

Dr. K. Rajgopal Shenoy deserves special appreciation for his vision and leadership in bringing together contributors who have generously shared their experience and expertise. This compilation reflects the spirit of the Association of Surgeons of India—collaboration, academic rigor, and an unwavering focus on patient welfare.

I am confident that this book will serve as an indispensable resource for postgraduate trainees, practicing surgeons, and teachers alike. More importantly, it will inspire surgeons to engage in thoughtful reflection, continuous learning, and compassionate care—ultimately improving outcomes for the patients we serve.

I commend the editor and contributors for this meaningful and timely contribution to surgical literature and wish this book the wide readership and impact it richly deserves.

**Dr H V Shivaram**



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