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CLINICAL MANIFESTATION, VARIOUS CAUSES AND MANAGEMENT OF SURGICAL JAUNDICE - A PROSPECTIVE STUDY IN 40 CASES

General Surgery

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ABSTRACT

Jaundice is a common problem in both medical and surgical practice. Its cause can often be correctly anticipated clinically but usually biochemical and radiological imaging investigations are required for confirmation. It could be due to a variety of causes and is broadly divided into obstructive (surgical) and non obstructive (medical) categories. **Aim:** The aim of this study is to evaluate the clinical presentation and various causes of surgical jaundice, to study the sites of obstruction in the biliary tree and the different modalities of treatment of surgical jaundice. **Material And Method:** This is a prospective study of 40 cases who are of adult age group having proven surgical jaundice by various radiological modalities (USG, MRCP, ERCP, CT SCAN ABDOMEN) during study period of 24months. **Results:** The patients with benign pathology presented with jaundice, pain abdomen and flatulent dyspepsia, whereas those with malignant pathology presented with jaundice, pain in abdomen, dark urine, pale stool and loss of appetite. Choledocholithiasis is the commonest cause for surgical jaundice. The main observation of this study is a good post operative outcome after open surgery with T-tube drainage. Open CBD Exploration remains a safe therapeutic procedure.

KEYWORDS

Jaundice, SGOT, SGPT, Bilirubin, ERCP, Histopathology, Diagnosis

INTRODUCTION

The word 'jaundice' comes from a French word “jaune” which means yellow, jaunisse meaning “yellow disease”. Jaundice is a yellowish staining of skin, sclera and mucous membranes by abnormally high levels of the bilirubin, a yellow-orange bile pigment. The yellowish discolouration may extend to other tissues and body fluids. Bilirubin is formed by the breakdown product of heme rings, usually from metabolized red blood cells. The discolouration can typically be detected clinically once serum bilirubin level rises above 3mg/dl.

Jaundice is a common problem in both medical and surgical practice that arises when there is an obstruction in the flow of bile from the liver to the second part of duodenum. The blockage may be intrahepatic or extra hepatic in the biliary duct system. It is one of the most challenging conditions managed by general surgeons and contributes significantly to high morbidity and mortality[3]. Jaundice due to obstruction of bile flow may be caused by a variety of disorders, which can either be benign or malignant, the most common of which being Choledocholithiasis. (ICD-10-CM:KSO, 83). Its cause can often be provisionally diagnosed clinically but biochemical and radiological imaging investigations are required for confirmation. It could be because of a variety of causes and is broadly divided into obstructive (surgical) and non obstructive (medical) categories. Obstructive jaundice (jaundice due to intra or extrahepatic organic obstruction to biliary outflow), can be difficult to diagnose and manage. The surgical jaundice can be caused by the obstruction of the common bile duct as with secondary to gall stones, strictures, malignancy, such as cholangiocarcinoma, carcinoma gall bladder and carcinoma head of pancreas & periampullary carcinoma. Various rare causes like Choledochal cyst; Caroli's syndrome and primary and metastatic liver tumors have also been reported.

Obstructive jaundice is not a definitive diagnosis and early investigation to elucidate the precise etiology is of great importance because it can lead to secondary biliary cirrhosis if obstruction is not treated. The symptoms of obstructive jaundice include jaundice with or without pain, dark urine, pruritis, pale stools, weight loss. Despite the technical advances, the operative modes of management of obstructive jaundice were associated with very high morbidity and mortality. However, during the last decade significant advances have been made in our understanding with regard to the pathogenesis, diagnosis, staging and the efficacy of management of obstructive jaundice. Total serum billirubin values are normally between 0.2-1.2 mg/dl. Jaundice may not be clinically recognizable until levels are atleast 3 mg/dl.

Obstructive jaundice of various etiologies is one of the leading causes of hospitalisation in India. In order to properly manage these patients, a complete knowledge of the etiopathogenesis, clinical presentation, and management of obstructive jaundice is essential.

In case of obstructive jaundice due to cholelithiasis, it can be seen among all age groups, it is most commonly seen in the 'fat, fertile, flatulent, female of forty' and the incidence increases with age.

Ultrasonography remains the only commonly available test in a resource limited country. The management of obstructive jaundice poses diagnostic and therapeutic challenges to general surgeons practicing in resource-limited countries. Invasive tests may cause cholangitis and imaging techniques like computed tomography (CT) scan, PTC (Percutaneous Transhepatic Cholangiography), ERCP(Endoscopic Retrograde Cholangiopancreaticography) and MRCP(Magnetic Resonance Cholangio Pancreaticography) are expensive and are not readily available in most centres in resource limited developing countries.

Surgery in jaundiced patients is associated with a higher risk of postoperative complications compared with surgery in non jaundiced patients[8]. These complications primarily consist of haemorrhage, septic complications (cholangitis, abscesses, and leakage), impaired wound healing and renal disorders. It has been reported that obstructive jaundice continues to be associated with significant morbidity and mortality despite recent advances both in preoperative diagnosis and postoperative care.

AIMS AND OBJECTIVES

- To study the clinical presentation and various causes of surgical jaundice.
- To study the sites of obstruction in the biliary tree and the different modalities of treatment of surgical jaundice.

MATERIAL AND METHODS

This is a Prospective study conducted in a tertiary care hospital (Maharishi Markandeshwar Institute of Medical Sciences and Research, MMU, Mullana, Ambala, Haryana, India). Duration of this study was 24months.

Method of Collection of Data- All the patients with clinical jaundice (Icterus) admitted in the Department of General Surgery, MMIMSR, Mullana, Ambala, Haryana, India were included in this study. After

admission, a detailed history was recorded and clinical examination was done. Relevant investigations were carried out to make a diagnosis. Patients were assessed preoperatively for the fitness for surgery and subjected to curative or palliative surgery depending on the pathology of the disease and general condition of the patient. The resected tissue was subjected to histopathological examination. Post operative complications were managed accordingly.

Inclusion Criteria

Age – More than 18 years.

Patients proven to have surgical jaundice by any investigative modality (LFT, USG, MRCP, ERCP, CT SCAN,) during the study period.

Exclusion Criteria

Medical Jaundice

The treatment plan was focused on adequate initial resuscitation and supportive care, early detection of complications, and definitive treatment of the associated biliary disease. Patients in whom symptoms improved with in 48-72 hrs, they were taken up for surgery i.e. open cholecystectomy and common bile duct exploration.

Pre-operative complications were noted in all the patients. Evaluated with CBC, RFT, LFT with enzymes, viral markers, Chest X ray, ECG, 2-D echo, PFT. Preoperative optimization was done for patients who were not fit for surgery at admission and after appropriate fitness given by Medicine and Anaesthesia department, patients were subjected to surgery.

Data included duration of stay in the hospital, conservative management, surgical procedures, complications if any and the follow up were carefully recorded. 39 patients underwent Open choledocholithotomy with T-tube insertion with right subcostal abdominal skin incision 1 patient underwent whipple's operation after rooftop abdominal skin incision.

Complication- post operative period was uneventful without any major complications like:

- Haemorrhage
- Bile leak
- Biloma
- SSI rate

- 10 patients who underwent open choledocholithomy with T- tube insertion presented with post op wound seroma which was managed conservatively with dressing.
- 1 patient who underwent whipple's operation had SSI without dehiscence which was managed conservatively with antibiotics based on culture and sensitivity and dressing.
- 29 patients had no post op complication
- Criteria for T- tube removal:

On post op day 10-14 T- tube was clamped and observed for 24-48 hours for development of pain, jaundice and fever.

T- tube cholangiogram was done and free flow of dye confirmed And T – tube was removed.

RESULTS:

This study included 40 patients with obstructive jaundice admitted in our surgical wards. These patients were subjected to study the clinical presentation, various causes of obstruction in the biliary system and the treatment of surgical jaundice according to the pathology.

Analysis Is As Follows:

Table 1: Distribution Of Patients According To Age Group

		Frequency	Percent
Age	<=30	5	12.5%
	31-40	7	17.5%
	41-50	10	25.0%
	51-60	9	22.5%
	>60	9	22.5%
	Total	40	100.0%

Among 40 patients of obstructive jaundice who are being observed in study maximum number of patient who presented with obstructive jaundice were among 41-50 years of age group.

Among 40 patients of obstructive jaundice in our study 72.5% were females and 27.5% were males.

Table 2: Distribution Of Patients According To Sex

		Frequency	Percent
Sex	Male	11	27.5%
	Female	29	72.5%
	Total	40	100.0%

Table 3: Distribution Of Patients According To Bilirubin Level

		Frequency	Percent
Bilirubin	<1.30	5	12.5%
	1.30-10.00	26	65.0%
	10.01-20.00	9	22.5%
	Total	40	100.0%

Among 40 patients of obstructive jaundice in our study 12.5% presented with bilirubin level below 1.30mg/dl, 65% with bilirubin ranging from 1.30-10mg/dl and 22.5% with values ranging from 10.01-20mg/dl.

Table 4: Distribution Of Patients According To ALP Level

		Frequency	Percent
ALP	Normal	11	27.5%
	Elevated	29	72.5%
	Total	40	100.0%

Among 40 patients of obstructive jaundice in our study 72.5% presented with Elevated ALP levels 27.5% presented with normal ALP levels.

Table 5: Distribution Of Patients According To SGOT Level

		Frequency	Percent
SGOT	Normal	18	45.0%
	Elevated	22	55.0%
Total		40	100.0%

Among 40 patients of obstructive jaundice in our study 55% presented with Elevated SGOT levels 45% presented with normal SGOT levels.

Table 6: Distribution Of Patients According To SGPT Level

		Frequency	Percent
SGPT	Normal	33	82.5%
	Elevated	7	17.5%
Total		40	100.0%

Among 40 patients of obstructive jaundice in our study 17.5% presented with elevated SGPT levels 82.5% presented with normal SGPT levels

Table 7: Distribution Of Patients With Symptoms

Table 7.1: Distribution Of Patients With Clinical Jaundice

		Frequency	Percent
Clinical jaundice	Present	36	90.0%
	Absent	04	10.0%
	Total	40	100.0%

Among 40 patients of obstructive jaundice in our study 90% presented with clinical jaundice.

Table 7.2: Distribution Of Patients With Abdominal Pain

		Frequency	Percent
Abdominal pain	Present	14	35.0%
	Absent	26	65.0%
	Total	40	100.0%

Among 40 patients of obstructive jaundice 35% presented with abdominal pain.

Table 7.3: Distribution Of Patients With Itching

		Frequency	Percent
Itching	Present	4	10.0%
	Absent	36	90.0%
	Total	40	100.0%

Among 40 patients of obstructive jaundice in our study 10% presented with Itching

Table 7.4: Distribution Of Patients With Flatulence Dyspepsia

		Frequency	Percent

Flatulence dyspepsia	Present	20	50.0%
	Absent	20	50.0%
	Total	40	100.0%

Among 40 patients of obstructive jaundice in our study 50% presented with flatulence dyspepsia

Table 7.5: Distribution Of Patients With Loss Of Weight

		Frequency	Percent
Loss of weight	Present	1	2.5%
	Absent	39	97.5%
	Total	40	100.0%

Among 40 patients of obstructive jaundice in our study 1 (2.5%) presented with loss of weight

Table 8: Distribution Of Patients According To Diagnosis

		Frequency	Percent
Diagnosis	Cholilithiasis with choledocholithiasis	38	95.0%
	Mirizzi Syndrome	1	2.5%
	Periampullary Carcinoma	1	2.5%
	Total	40	100.0%

Among 40 patients of obstructive jaundice who are being observed in study 95% of patient presented with cholelithiasis with choledocholithiasis, 2.5% presented with mirizzi syndrome another 2.5% presented with periampullary carcinoma.

Table 9: Distribution Of Patients According To Management

		Frequency	Percent
Management	Open Cholecystectomy with CBD exploration	39	97.5%
	Whipple's Procedure	1	2.5%
	Total	40	100.0%

Among 40 patients of obstructive jaundice who are being observed in study 97.5% of patient presented withobstructive jaundice were managed with open cholecystectomy with CBD exploration, 2.5% patients managed with whipple's procedure.

DISCUSSION

Obstructive jaundice is a common presentation of biliary tree pathology. The evaluation and management of the patient with surgical jaundice is of utmost importance to the young treating practitioners as they face difficulty in diagnosing surgical jaundice. Diagnosing a case of surgical jaundice requires, a detailed clinical history, with complete general physical and systemic examination with relevant investigations.

In this study, the clinical presentation, various causes of surgical jaundice, various sites of obstruction of the extrahepatic biliary tree and the treatment of surgical jaundice according to the pathology were studied. Investigations were carried out and operative procedures were conducted according to the pathology. Total number of cases were 40. The results were compared with other similar studies.

Those with benign pathology commonly presented with jaundice, pain abdomen and flatulent dyspepsia, whereas those with malignant pathology presented with jaundice, pain in abdomen, dark coloured urine, pale stools and decreased appetite.

Malignant case had Icterus and a palpable gall bladder when compared to benign conditions. Obstructive jaundice secondary to common bile duct stones remained the commonest cause.

Ultrasonography whole abdomen was done in every patient with jaundice as a standard imaging modality. USG was used as a cost effective, non-invasive investigation to know the cause and site of obstruction in all the patients. The drawback of USG is that it is subjective as it is highly operator dependent.

CT scan: It was also used in few cases to confirm the diagnosis made on USG.

Patient with surgical jaundice due to Choledocholithiasis underwent Cholecystectomy with CBD exploration with T-tube drainage.

Patient with surgical jaundice due to periampullary carcinoma underwent Whipple procedure.

Patient with surgical jaundice due to mirizzi syndrome underwent cholecystectomy with CBD exploration with T- tube drainage.

Table 10: Comparison Of Mean Age In Different Studies vs Present Study

Sr. No	Studies	Year	Mean Age
1.	Present study	2021	41-50
2.	S Verma et al	2011	50.4
3.	T. Shalini et al	2019	55.5
4.	Padhy B et al	2018	55.8

In this study, Among 40 patients of obstructive jaundice who are being observed in study maximum number of patient who presented with obstructive jaundice were among 41-50 years of age group which is in accordance with et al S Verma IJTM 2011 Sept where mean age group was 50.4years but in similar study Padhy B et al. Int Surg J. 2018 Jan;5(1):138-142 the mean age group was 55.8 and in et al. Dr.T.Shalini IOSR journal 2019 Oct the mean age group was 55.5.

Table 11: Comparison Of Gender Distribution B/w Present And Other Studies

Sr. No.	Studies	Year	Female	Male
			%	%
1	Present Study	2021	72.5	27.5
2	S Verma et al	2011	44	56
3	T. Shalini et al	2019	46.7	53.3
4	Padhy B et al	2018	44	56

In this study, Among 40 patients of obstructive jaundice who are being observed in study maximum number of patient 29 (72.5%) were female and 11 (27.5%) were male who presented with obstructive jaundice with female predominance but in similar studies et al S Verma IJTM 2011 Sept in which there were 56%% males and 44% females, Padhy B et al. Int Surg J. 2018 Jan;5(1):138-142 there were 56 (56%) male and 44 (44%) female and in et al Dr. T.Shalini IOSR journal 2019 Oct there were 16 (53.3%) male and 14 (46.7%) female with slight male predominance.

Table 12: Comparison Of Bilirubin Level Between Present And Other Studies

Sr. no	Studies	Year	Bilirubin level
			%
1.	Present study	2021	87.5
2.	S Verma et al	2011	41
3.	T. Shalini et al	2019	93.3
4.	Padhy B et al	2018	94

In this study, Among 40 patients of obstructive jaundice who are being observed in study 87.5% of patient presented with Elevated bilirubin levels out of which 65% and 22.5% were in the range of 1.03-10mg/dl and 10.01-20mg/dl respectively which is in accordance with Padhy B et al. Int Surg J. 2018 Jan;5(1):138-142 in which 94% of the patient presented with elevated bilirubin levels and in et al Dr. T.Shalini IOSR journal 2019 Oct there were 93.3% of the patients with Elevated bilirubin, but in similar study et al S Verma IJTM 2011 Sept there were 41% of the patients with elevated bilirubin levels.

Table 13: Comparison Of ALP Level Between Present And Other Studies

Sr. no	Studies	Year	ALP level
			%
1.	Present study	2021	72.5
2.	S Verma et al	2011	70
3.	T. Shalini et al	2019	96.7
4.	Padhy B et al	2018	96

In this study, Among 40 patients of obstructive jaundice who are being observed in study 72.5% of patient presented with Elevated ALP levels which is in accordance with et al S Verma IJTM 2011 Sept there were 70% of the patients with elevated ALP levels , but in similar study Padhy B et al. Int Surg J. 2018 Jan;5(1):138-142 in which 96% of the patient presented with elevated ALP levels and in et al Dr. T.Shalini IOSR journal 2019 Oct there were 96.7% of the patients with ALP bilirubin.

In this study, Among 40 patients of obstructive jaundice who are being

observed in study 55% of patient presented with Elevated SGOT levels which is in accordance with et al S Verma IJTM 2011 Sept there were 60% of the patients with elevated SGOT levels , but in similar study Padhy B et al. Int Surg J. 2018 Jan;5(1):138-142 in which 96% of the patient presented with elevated SGOT levels and in et al Dr. T.Shalini IOSR journal 2019 Oct there were 96.7% of the patients with elevated SGOT level.

Table 14: Comparison Of SGOT Level Between Present And Other Studies

Sr. no	Studies	Year	SGOT level
			%
1.	Present study	2021	55
2.	S Verma et al	2011	60
3.	T. Shalini et al	2019	96.7
4.	Padhy B et al	2018	96

Table 15: Comparison Of SGPT Level Between Present And Other Studies

Sr. no	Studies	Year	SGPT level
			%
1.	Present study	2021	17.5
2.	S Verma et al	2011	72
3.	T. Shalini et al	2019	96.7
4.	Padhy B et al	2018	96

In this study, Among 40 patients of obstructive jaundice who are being observed in study 17.5% of patient presented with Elevated SGPT levels but in similar study with et al S Verma IJTM 2011 Sept there were 72% of the patients with elevated SGPT levels , Padhy B et al. Int Surg J. 2018 Jan;5(1):138-142 in which 96% of the patient presented with elevated SGPT levels and in et al Dr. T.Shalini IOSR journal 2019 Oct there were 96.7% of the patients with Elevated SGPT levels.

Table 16: Comparison Between Present And Other Studies According To Clinical Jaundice

Sr. no	Studies	Year	Clinical Jaundice
			%
1.	Present study	2021	90
2.	S Verma et al	2011	88
3.	T. Shalini et al	2019	93.3
4.	Padhy B et al	2018	98

In this study, Among 40 patients of obstructive jaundice who are being observed in study 90% of patient presented with clinical jaundice which is in accordance with clinically et al S Verma IJTM 2011 Sept there were 88% of the patients with jaundice clinically and et al Dr. T.Shalini IOSR journal 2019 Oct there were 93.3% of the patients with clinical jaundice but in similar study Padhy B et al. Int Surg J. 2018 Jan;5(1):138-142 the patient presented with clinical jaundice were 98%.

Table 17: Comparison Between Present And Other Studies According To Pain Abdomen

Sr. no	Studies	Year	Pain Abdomen
			%
1.	Present study	2021	35
2.	S Verma et al	2011	66.2
3.	T. Shalini et al	2019	83.3
4.	Padhy B et al	2018	93

In this study, Among 40 patients of obstructive jaundice who are being observed in study 35% of patient presented with abdominal pain but in similar study Padhy B et al. Int Surg J. 2018 Jan;5(1):138-142 there were 93% of the patient presented with abdominal pain and in et al Dr. T.Shalini IOSR journal 2019 Oct there were 83.3 % with abdominal pain, In et al S Verma IJTM 2011 Sept there were 66.2% patients with pain in abdomen.

Table 18: Comparison Between Present And Other Studies According To Itching

Sr. no	Studies	Year	Itching
			%
1.	Present study	2021	10
2.	S Verma et al	2011	54.5
3.	T. Shalini et al	2019	46.7
4.	Padhy B et al	2018	28

In this study, Among 40 patients of obstructive jaundice who are being observed in study 10% of patient presented with Itching but in similar study Padhy B et al. Int Surg J. 2018 Jan;5(1):138-142 there were 28% of the patient who presented with itching, in et al Dr. T.Shalini IOSR journal 2019 Oct there were 46.7% of the patients with itching and in et al S Verma IJTM 2011 Sept there were 54.5 % who had itching.

In this study, Among 40 patients of obstructive jaundice who are being observed in study 50% of patient presented with flatulence dyspepsia this symptom was not found in any other similar studies.

Table 19: Comparison Between Present And Other Studies According To Loss Of Weight

Sr. no	Studies	Year	Weight loss
			%
1.	Present study	2021	2.5
2.	S Verma et al	2011	43.6
3.	T. Shalini et al	2019	63.3
4.	Padhy B et al	2018	62

In this study, Among 40 patients of obstructive jaundice who are being observed in study 2.5% of patient presented with loss of weight but in similar study Padhy B et al. Int Surg J. 2018 Jan;5(1):138-142 there were 62% of the patients presented with loss of weight, in et al Dr. T.Shalini IOSR journal 2019 Oct there were 63.3% patient presented with loss of appetite/weight and in et al S Verma IJTM 2011 Sept there were 43.6 % who had loss of weight/ appetite on presentation.

Table 20: Comparison Between Present And Other Studies According To Diagnosis

Sr. no	Studies	Year	Benign cause Jaundice	Malignant Cause Jaundice
			%	%
1.	Present study	2021	97.5	2.5
2.	S Verma et al	2011	37.3	62.7
3.	T. Shalini et al	2019	37.7	63.3
4.	Padhy B et al	2018	33	67

In this study, Among 40 patients of obstructive jaundice who are being observed in study 97.5% presented with benign cause of surgical jaundice among which 95% of patient presented with cholelithiasis with choledocholithiasis and 2.5% presented with mirizzi syndrome, 2.5% presented with malignant cause of jaundice but in similar study Padhy B et al. Int Surg J. 2018 Jan;5(1):138-142 there were 67% of the cases had malignant cause of surgical jaundice and 33% had benign surgical jaundice, in et al Dr. T.Shalini IOSR journal 2019 Oct there were 63.3% of the patients that had malignant cause of surgical jaundice followed by 37.7% had benign surgical jaundice and in et al S Verma IJTM 2011 Sept there were 62.7% of the cases had malignant cause of surgical jaundice and 37.3% had benign surgical jaundice.

Table 21: Comparison Between Present And Other Studies According To Management

Sr. no	Studies	Year	Cholecystectomy with CBD Exploration	Whipple's procedure	Choledochoduodenostomy/ Choledochojejunostomy
			%	%	
1.	Present study	2021	97.5	2.5	0
2.	T. Shalini et al	2019	23.3	6.6	33.3
3.	Padhy B et al	2018	18	2	35

In this study, Among 40 patients of obstructive jaundice who are being observed in study 97.5% of patient presented with obstructive jaundice were managed with open cholecystectomy with CBD exploration, 2.5% patients managed with whipple's procedure but in similar study Padhy B et al. Int Surg J. 2018 Jan;5(1):138-142 there were 35% of the patients who underwent cholecysto- jejunostomy and jejunojejunostmy bypass procedure followed by 2% underwent whipple's procedure and in et al Dr. T.Shalini IOSR journal 2019 Oct 33.3% underwent cholecystojejunostomy and jejuno jejunostomy bypass procedure followed by 6.6% underwent whipple's procedure 23.3% underwent CBD exploration.

CONCLUSION

In this study we concluded:

- In our study out of 40 patients of obstructive jaundice and, the youngest patient was 19 years and the eldest was 74 years old. The

highest incidence (25%) was noted in 41-50 years of age group.
- There was female predominance (72.5%) of obstructive jaundice as compare to the males (27.5%) with a male-to-female ratio of 1:2.7
- In this study, most of male patient (55.6%) were in the age group of above 60years, surgical jaundice was more predominant. Most (of female patients35.7%) were in the age group of 30-40 years.
- The most common presentation, apart from jaundice was flatulence dyspepsia (50%), pain abdomen (35%), itching (10%) and weight loss (2.5%).
- Icterus was present in 36 patients (90%). Pain abdomen and flatulent dyspepsia were more in patients with benign condition whereas jaundice, clay-coloured stools, dark coloured urine with itching were more common in case of malignancy.
- High values of serum Bilirubin & alkaline phosphatase were noted in case of malignancy.
- USG was the cheapest non-invasive investigation used for diagnosis of surgical jaundice.
- Most common cause of obstruction was CBD calculi, followed by malignancy and mirizzi syndrome.
- For CBD calculi, Open Cholecystectomy with CBD exploration and drainage procedure was done with T tube insertion.
- For malignancy operative procedure done was Whipple's surgery.
- Increasing reliance of ERCP and MRCP for biliary tract imaging has helped to diagnose the pathology earlier and early intervention can be initiated.
- All the patient that underwent open choledocholithotomy had uneventful post operative period with any major complications.
- One patient that underwent whipple's had suture site infection.
- 10 patients who underwent open choledocholithomy with T- tube insertion presented with post op wound seroma which was managed conservatively with dressing.

The main observation of this study is a good operative outcome after open surgery with T-tube drainage. Open CBD Exploration remains a safe therapeutic procedure in case of choledocholithiasis.

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