DOES STAGING LAPAROSCOPY AVOID NON-THERAPEUTIC LAPAROTOMIES IN EXTRAHEPATIC BILIARY AND PERIAMPULLARY CARCINOMA.

Dissertation submitted to

THE TAMILNADU DR .M.G.R MEDICAL UNIVERSITY

CHENNAI

In partial fulfillment of requirements for the degree of

Mch BRANCH VI
SURGICAL GASTROENTEROLOGY AND PROCTOLOGY

THE TAMILNADU Dr.M.G.R MEDICAL UNIVERSITY

AUGUST 2009

CERTIFICATE

This is to certify that the project work carried out during 2006-2009 for the partial fulfillment of the requirement for the degree of Mch (Surgical gastroenterology and Proctology) titled,"Does staging laparoscopy avoid non-therapeutic laparotomies in Extrahepatic biliary and periampullary carcinoma?" is a bonafide work carried out by Dr.L.ANAND, post graduate student in the Department of Surgical Gastroenterology and Proctology, Madras Medical College,Chennai-3.The study was conducted under my guidance and supervision .

DEAN **PROF.& H.O.D**

Place :

Date :

ACKNOWLEDGEMENT

I gratefully acknowledge and sincerely thank The Dean ,Madras Medical College, Chennai for granting me permission to conduct and to utilize the facilities in this institution for my study.

I would like to express my sincere and profound thanks to Prof.S.M. Chandramohan and Prof. A. Rathnaswami and to Prof.Srikumari Damodaram (Retd.), Department of Surgical Gastroenterology and proctology for their guidance, supervision, and valuable support during the study .

I wish to profusely thank my Assistant professors Dr.O.L Naganath Babu, Dr.T.Selvaraj, Dr.A.Amudhan and Dr.P.Raghumani, Department of Surgical Gastroenterology and proctology for their valuable guidance and suggestions throughout the study.

My sincere thanks to Dr.K.Punitha ,Assistant professor and statistician, Meenakshi medical college, Kanchipuram for her enthusiastic support.

I am grateful to the Professor and HOD of the Department of pathology, Madras Medical College, Chennai for the valuable support in conducting the study.

TABLE OF CONTENTS

CHAPTER I

INTRODUCTION

CHAPTER I

INTRODUCTION

Hepatobiliary pancreatic malignancies form a major part of gastrointestinal surgical practice. Apart from hepatic and pancreatic malignancies the incidence of bile duct tumours constitute about 2% of all reported cancers.It is an uncommon cancer with an incidence of 1-2 per 100,000 in United states [1] the advent of new diagnostic methods applicable in obstructive jaundice has led to the pre operative discovery of many more of these lesions ,which almost certainly were misdiagnosed in the past .Most patients are older than 65 years of age and the peak incidence occurs in the 70's [2]

- 40-60% of cholangiocarcinoma develop at the hilum
- 20-30% arise in the distal lower biliary tract
- <10% arise intrahepatically [3,4]

Cancer of the gall bladder is the most common biliary malignancy and is the Fifth most common gastrointestinal cancer . In the United states it has an incidence of approximately 1.2 per 1,00,000 and is the cause of about 2800 deaths yearly [5]. Owing to its aggressive nature (manifested by The propensity toward nodal metastases ,direct hepatic invasion and seeding of peritoneal surfaces,it is usually diagnosed at an advanced stage resulting

in an overall medium survival of less than 6 months. Recent advances in understanding of the tumour biology accompanied by significant progress in diagnostic and surgical extirpative techniques, have motivated a fresh new approach to the universally fatal disease providing the possibility of cure to a subset of patients presenting with gall bladder cancer.

Ampullary carcinoma is the second most common periampullary carcinoma With an overall incidence of 6 cases per 1 million or approximately 1800 Case per year in the United states [6]. Although it accounts for a higher percentage of operative cases because these lesions are more amenable to complete resection [7].Distal bile duct carcinoma occur less frequently than pancreas and ampullary carcinoma.

Pathological examinations of resected pancreaticoduodenctomy specimen reveal that approximately 40-60% are performed for adenocarcinoma of the pancreas,10-20% are performed for adenocarcinoma of the ampulla, 10% are performed for bileduct adenocarcinoma. 5-10% are performed for duodenal adenocarcinoma [8].

Elderly patients presenting with painless progressive jaundice must be aggressively investigated for biliary tract, gall bladder, pancreatic and periampullary carcinoma. Though modern imaging modalities like USG abdomen, CECT scan , MRI with MRCP, ERCP, Doppler with duplex scan

can diagnose the primary lesion with accuracy the role of these imaging tests in picking up small liver , peritoneal and serosal metastasis are questionable.Hence, staging laparoscopy to pick up these small metastatic disease is essential. Staging laparoscopy is a simple , minimally invasive technique to identify radiographically occult distant metastatic disease and prevent non-therapeutic laparotomies,but its routine use in patients with radiologically resectable pancreatic and peripancreatic malignancy remains controversial . This study assesses the value of staging laparoscopy in avoiding non-therapeutic laparotomies in extra hepatic biliary, periampullary and gallbladder carcinoma.

CHAPTER II

OBJECTIVE

CHAPTER II

OBJECTIVE

To evaluate if:

1. Staging laparoscopy avoids non-therapeutic laparotomies in extra hepatic biliary and periampullary carcinoma.

2. Is it worthwhile to do it as a routine for all cases or be selective in offering staging laparoscopy to reduce the health care costs?

CHAPTER I11

JUSTIFICATION

CHAPTER III

JUSTIFICATION

1.The value of diagnostic staging laparoscopy in pancreatic cancers i.e. the yield has gone to >30% in some studies and hence its use is already established in the staging workup [9,10].

2.Laparoscopy has been noted to be useful on assessing primary heptocellular carcinoma [11].

3.For other less common cancer such as duodenal carcinoma ,ampullary carcinoma ,distal cholangiocarcinoma controversy exists as to the yield of detecting metastatic disease,which is much lower [12].

4.Some authors have argued that the yield of staging laparoscopy is sufficiently low in patients with radiologically resectable tumors.They also claim that with modern imaging,this test need not be performed routinely and a more selective approach is appropriate [13,14,15,16].

5.This subject has brought in lot of controversies in various HPB units across the globe . Also there is not much evidence in literature regarding this subject.

CHAPTER IV

REVIEW OF LITERATURE

CHAPTER IV

REVIEW OF LITERATURE

The development of laparoscopy in recent decades has served both the patient and the general surgeon. Practitioners are merging the principles of oncology and minimal invasive surgery to develop innovative procedures and establishing diagnostic roles to complement non-invasive technologies patient' s benefit from the brief recovery times associated with minimal invasive procedures and a high sensitivity associated with laparoscopic exploration. The demonstrated sensitivity limits the number of non therapeutic laparotomies performed for gastrointestinal malignancies. The progress toward minimally invasive diagnostic procedures has driven technical advances in laparoscopic instruments and clinical research demonstrating that advanced maneuvers in minimally invasive surgery provide relevant data to stage abdominal malignancies.

Minimal invasive procedures have roots dating back to a century Innovative work by Ott ,kelling and Jacobeus each working independently in Europe , laid the ground work for today's minimal invasive procedure [17]. Their works focussed on a diagnostic role for minimal invasive surgery. During the 1930s advanced optics and the use of pneumoperitoneum made laparoscopy more powerful and encouraged

a small group of proponents both in Europe and America.Further innovations in video laparoscopy using three chip cameras and the promotion of therapeutic laparoscopy in the past decade now helped to promote diagnostic laparoscopy as a practical staging modality for abdominal malignancies.

A wide range of investigations such as ultrasound examination, CT scan, MRI, angiography, positron emission tomography(PET), nuclear medicine studies, endoscopy and endoscopic ultrasound are performed in various combinations to assess the exact stage of malignancy. Imaging studies, however are not always precise and often results in high Incidence of non-therapeutic laparoscopy. In many cases,these cancers are thought to be resectable until the time of laparotomy during which widespread or metastatic disease is discovered ,precluding resection. These discrepancies often result in either over estimation or underestimation of the disease.

The view of the peritoneal cavity provided by the magnification of the laparoscopy is superior to any other investigation(for example viewing tiny peritoneal and subcapsular liver metastases).

The limitation of laparoscopy such as lack of tactile sensation, difficulty in

identification of lymphnode ,vascular structures and the tumour itself can be compensated by the use of laparoscopic ultrasonogram and expand the pool of patients who will benefit from diagnostic laparoscopy.The ability to differentiate the patients who might benefit from curative resection from those who would be best managed by either palliative therapy could minimize patient morbidity and decrease the incidence of non-therapeutic laparoscopy.

A subgroup of patients who are unresectable can be chosen for adjuvant chemotherapy for downstaging the disease and resection can be planned at a later date.

Currently diagnostic laparoscopy is used in conjunction with conventional imaging techniques to diagnose malignant conditions and to assess metastatic spread within the abdomen and the pelvis .

The recommendation for diagnostic laparoscopy must be based on the individual patients suspected diagnosis, on the previous assessment of the patient's stage using physical examination and non-invasive radiologic studies. An understanding of the overall plan for cure or palliation becomes important when selecting patients who might benefit from diagnostic laprascopy.For many patients,the ability to perform palliative procedures such as gastrojejunostomy ,cholecystojejunostomy loop colostomies and

feeding tube placement enables the surgeon to broaden the indications for laparoscopy by combining diagnostic and therapeutic procedures.

Technique of staging laparoscopy:

Preoperative care must include informed consent with conscientious explanation of the goals or diagnostic laparoscopy.. Bowel preparation is not necessary,but enhance the surgeons ability to manipulate and retract small bowel loops and the colon. In general, it is a clean procedure suggesting that antibiotics are not usually indicated. The use of deep venous thrombosis (DVT) prophylaxis must be patient specific .All patients should be considered for the use of graduated elastic stockings.

Patient's position:

Once the patient is placed under general anaesthesia proper positioning is mandatory .The patient is kept in a supine position with arms extended laterally, and a foot board is affixed to the surgical table to support the patients weight during steep reversed trendelenburg positioning.

Pneumoperitoneum:

Pneumoperitoneum is created either by closed veress needle technique or by Hasson technique.Hasson technique is often favoured in the setting of previous abdominal surgery or if bowel adhesions are suspected.Additional

trocars are placed depending on the quadrant to be examined.Grasping forceps and biopsy forceps are used for evaluation.

Trocar positioning:

Commonly 10-11 mm trocar is to be placed immediatedly above or below the umbilicus. 5mm trocars are positioned bilaterally under videoscopic guidance .These 5mm trocars are placed on the right and left quadrant of the abdomen, just above the umbilical level on the mid claviucular line. The 10mm port is the camera port,for using 0 or30 degree telescopes. Through the 5mm ports appropriate accessories for grasping of tissues and taking biopsy of suspicious nodules can be introduced .

Techniques used during diagnostic or staging laparoscopy:

- Full abdominal and pelvic evaluation
- Division of gastrohepatic omentum
- Biopsy using cupped forceps or core needle
- Abdominal lavage for cytology study
- Retrival of ascitic fluid for cytology
- Identification and removal of enlarged lymphnodes
- Laprascopic ultrasonography

Inverted TNM mode:

Laparoscopic staging must be conducted in an inverted TNM Mode [18] ,evaluating distant metastasis initially, followed by nodal status and finally the tumour staging. Ascites, if present is invariably aspirated and examined for malignant cytology. Some surgeons have described the technique of peritoneal lavage as a part of staging procedure.200 ml of normal saline is instilled into the peritoneal cavity.Specimens for cytology \
are aspirated from the pelvis ,paracolic gutter and sub diaphragmatic spaces on either sides and sent to pathology for cytologic evaluations. The utility of abdominal lavage has been documented most notably,warshaw et al [19] demonstrated positive pancreatic cancer cytology in 17 percent of patients without evidence of metastatic disease by non invasive studies.36% of these patients had no other evidence of metastatic disease,yet patients with positive cytology as their only indication of distant disease were unresectable in all cases.

The individual areas visualized are

- parietal and visceral serosal surfaces of the peritoneum
- thorough examination of the pelvis
- presence of krukenburg secondaries in ovaries

- surface of omentum diaphragm,liver and spleen
- entire small and large bowel

liver is closely inspected and suspected lesions are biopsied with biopsy forceps.Alternatively trucut biopsy needles may be used to biopsy liver or nodal tissue. Peritoneal attachments of the liver has to be divided for thorough assessment.Lesions over the surface of the liver may be nodular or with depressed centre appearing like a moon crater .Bleeding may be noted after biopsy of the liver .Application of minimal cautery in the area of biopsy usually stops the bleeding.

Extended diagnostic laprascopy:

Conlon et al [20] have described a standard technique for performing staging laprascopy in cases of pancreatic cancer which involoves meticulous assessment of the peritoneal cavity, liver, lesser sac, porta hepatic duodenum, transvers mesocolon and celiac and portal vessels.Four trocars (10mm trocars in right and left upper quadrants, 5mm trocar in epigastric region and 10mm umbilical camera trocar)are used to perform the diagnostic laparoscopy .Initial assessment is of the entire peritoneal cavity for distant metastasis and biopsy of the suspected lesions.Peritoneal washings are thus obtained. Subsequently complete assessment of the primary pancreatic tumour is done for size,local extension and fixation.Then

the periportal area is inspected and suspicious lymph nodes are biopsied at the same time.Both lobes of the liver are assessed in a systematic matter.The colon, mesocolon and middle colic vessels are then examined.Assessment of the caudate lobe ,inferior venacava and celiac axis is done after division of gastrohepatic ligament.Staging can also be performed as a separate operation before planning a pancreatic resection .

Laparoscopy ultrasound (LUS):

The introduction of laparoscopic ultrasound has helped the surgeons to see beyond the surface and even surpass the tactile feed back in certain situations. Laparoscopic ultrasound was first reported by Fukuda et al.in 1981 in patients with liver tumours [21]. laparoscopic ultrasound has increased the accuracy for staging hepatobiliary, pancreatic and gastric neoplasms. Proponents have even suggested that early LUS will optimize patient selection and will replace conventional radiologic studies in future staging protocols [22]. Ultrasound probes using conventional B-mode and color Doppler technology permit identification of deep liver lesion ,small peritoneal lesions, vascular invasion and enlarged lymph nodes.LUS also may accurately direct biopsy ,assess proximity to surrounding structures,and allow evaluation of celiac and peripancreatic masses without local dissection. A variety of LUS system and probes are available.Most probes

pass easily through standard 10mm trocars .Doppler ultrasound with color flow is an added feature that may characterize vascular flow velocities and waveforms typically.LUS is performed using 5 or 7.5 Mhz probes. The decreased interference associated with applying LUS probes directly onto an organ surface allows the high resolution of 7.5 Mhz probes without creating image distortion or compromising the depth of organ penetration. One can often penetrate upto 7 cm of liver parenchyma and identify lesions as small as 3 mm in diameter.LUS also can be used to identify abnormal lymph nodes in the celiac,gastric,portal and peripancreatic region..A useful rule for evaluation of lymphadenopathy is that nodes greater than 1 cm in diameter or irregularly shaped must be suspected for malignant involvement.

Retroperitonel peripancreatic and celiac nodes may be evaluated by entering the lesser sac. This avoids dissection into the retoperitoneum .Callery et al analysed the role of staging laparoscopy with laparoscopic Ultrasonography in HPB malignancies.In 50 consequetive patients with HPB malignancy staging laparoscopy alone demonstrated previously unrecognized occult metastses in 11 patients .In 2 other patients in whom staging laprascopy alone was negative LUS established unresectability from vascular invasion(n=5), lymph node metastases (n=5) or intraparenchymal hepatic tumor (n=1) increasing the detection of

metastasis disease to 34% [23].D,Angelica et al [24] found low accuracy for lymph node metastases (7%) and vascular invasion (18%) with LUS.The data were analysed further to improve the yield from laparoscopy.

The authors concluded that surgeon's pre operative judgement regarding the likelihood of resectability was remarkably predictive, although it depends on the experience of the surgeon and the quality of pre operative imaging The completeness of the laparoscopy staging procedure and the primary diagnosis also were shown to be important variables , with biliary cancers benefiting the most whereas colorectal metastasis have the lowest yield . Laparoscopy,has been noted to be useful in assessing primary Hepatocellular carcinoma(LO and co workers1998)Laparoscopic staging in pancreatic cancer has found to be beneficial.Apart from detecting occult metastasis in liver and peritoneum there was significantly reduced post operative median hospital stay of two days compared with seven days for patients undergoing open exploration alone [25] Some surgeons do not advocate routine staging laprascopy.Critics believe that inoperability secondary to vascular involvement or local extension can be confirmed only at open exploration[26]. Others maintain that the role of laparoscopy is limited because there are

few patients who do not need some form of prophylactic bypass-biliary or gastric or both[27].They further argue that staging laparoscopy is not a cost effective procedure because it adds to operative time or is performed as a separate procedure and has decreasing diagnostic yield because of the improvements in the radiologic imaging[28].Despite the usefulness of staging laprascopy in most pancreatic neoplasms, its use has not been shown to be beneficial in patients with ampullary or duodenal tumours [29,30]. These cancers tend to present earlier and are less likely to have metastatic disease at the time of presentation.These tumours may present with symptom suggesting gastric outlet obstruction or with bleeding –both of which would indicate resection even in the presence of laparoscopically detected metastatic disease.

The current literature suggests that approximately 20% of pancreas with adenocarcinoma of the pancreas would benefit from laprascopic staging ,not with standing the advance in non invasive imaging modalities ,the yield is less in islet cell tumour but seems worthwhile .In contrast,laparoscopic staging has limited value for ampullary and duodenal tumours and should be used only in selected cases.

CHAPTER V

METHODOLOGY

CHAPTER V

METHODOLOGY

STUDY DESIGN:

Prospective observational study

STUDY PERIOD:

September 2006-March 2009

STUDY POPULATION:

30 consecutive patients presenting with obstructive jaundice found to have hilar cholangiocarcinoma,gall bladder carcinoma,mid CBD cancer and periampullary Carcinoma by imaging modalities

EXCLUSION CRITERIA

- Any patient whose preoperative radiologic assessment suggested distant metastasis or Locally advanced unresectable disease.
- Patients who are not fit for general anaesthesia
- Patients with severe co-morbid diseases which may affect positive pressure
- pneumoperitoneum were all excluded from the study.

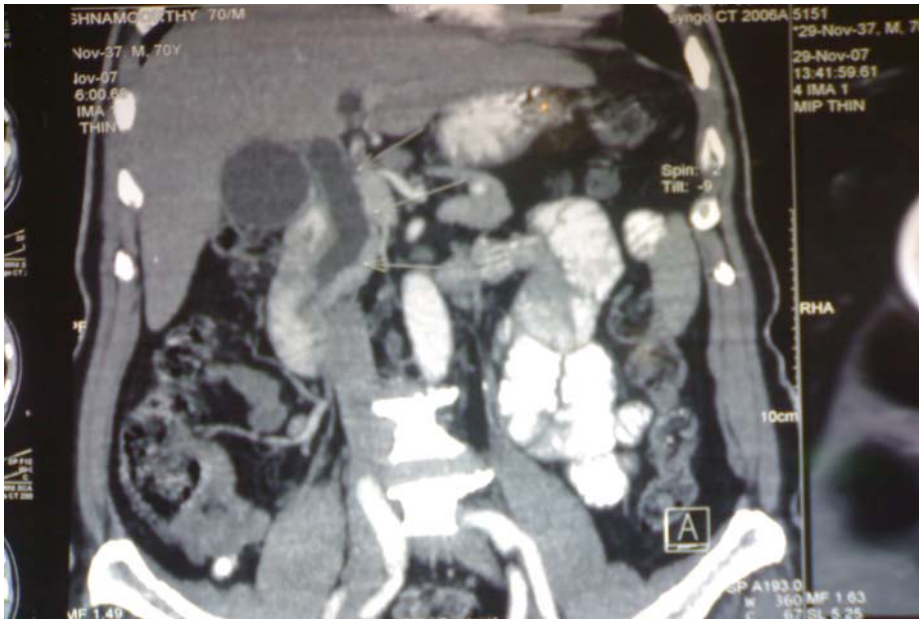
Inclusion criteria

Diagnostic laparoscopy was performed for all cases diagnosed to have extrahepatic biliary and periampullary carcinoma which was found to be

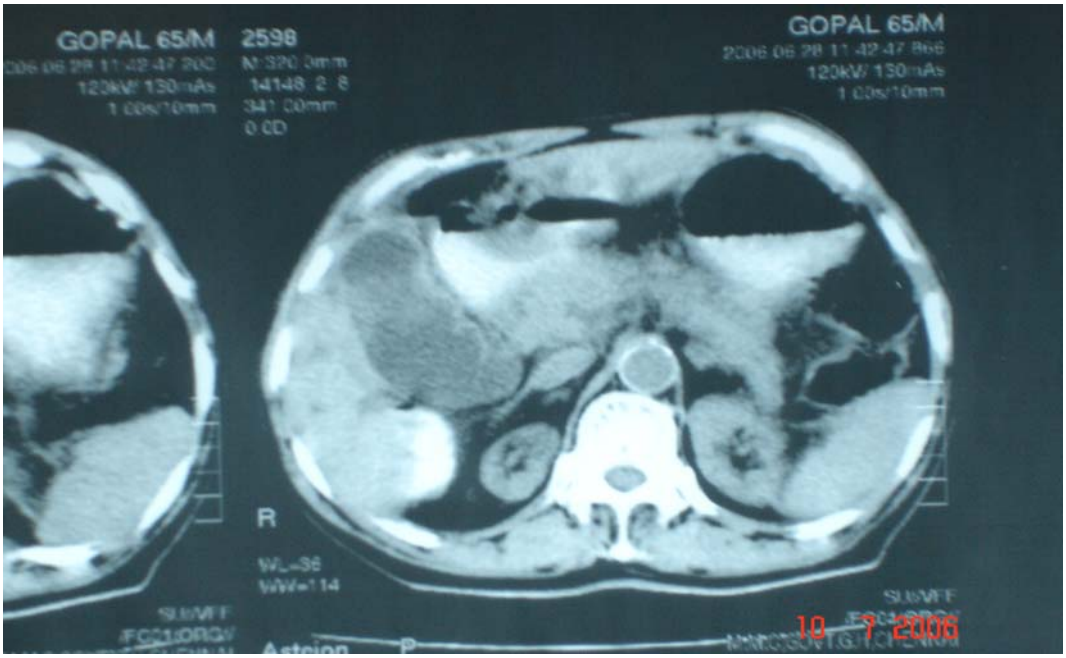
potentially resectable without major blood vessel infiltration not locally advanced and no history of metastatic disease.

Radiological imaging consisted of trans abdominal ultrasonagram, contrast enhaced CT scan of the abdomen,magnetic resonance imaging and Doppler with duplex scan to assess vascular involvement by the tumour.Dopler with duplex scan was done only for cholangiocarcinoma and gall bladder carcinoma cases.Side viewing scopy with biopsy was done in six cases of periampullary Carcinoma.

A PATIENT WITH OBSTRUCTIVE JAUNDICE DUE TO CARCINOMA GALLBLADDER



CECT SCAN OF PERIAMPULLARY CARCINOMA



CECT SCAN OF CARCINOMA GALLBLADDER

Staging laparoscopy technique:

Diagnostic laparoscopy was performed with general anaesthesia as a pre-incisional procedure.

Patients position:

Supine on the operating table with urinary bladder catheterisation and Ryles tube insertion to deflate the stomach.

An open technique of trocar insertion and carbon-di- oxide insufflation for pneumoperitoneum was created in all cases .1 cm sub umbilical incision was made to expose the abdominal wall fascia.the peritoneum was opened under direct vision and a 10/11 mm trocar was inserted (endopath,ethicon endo-surgery).This was attached to a Co2 insufflator.Co2 insufflation was commenced through this trocar to an intra abdominal pressure of 12- 14 mm of Hg.A 30 degree angled telescope was used to view the peritoneal cavity .Two further 5mm trocars were inserted underdirect vision .These trocars were inserted into the right and left upper quadrant respectively.

Instruments inserted through 5mm ports were used to facilitate exposure and perform biopsies.After creating pneumo peritoneum and port placememt, the

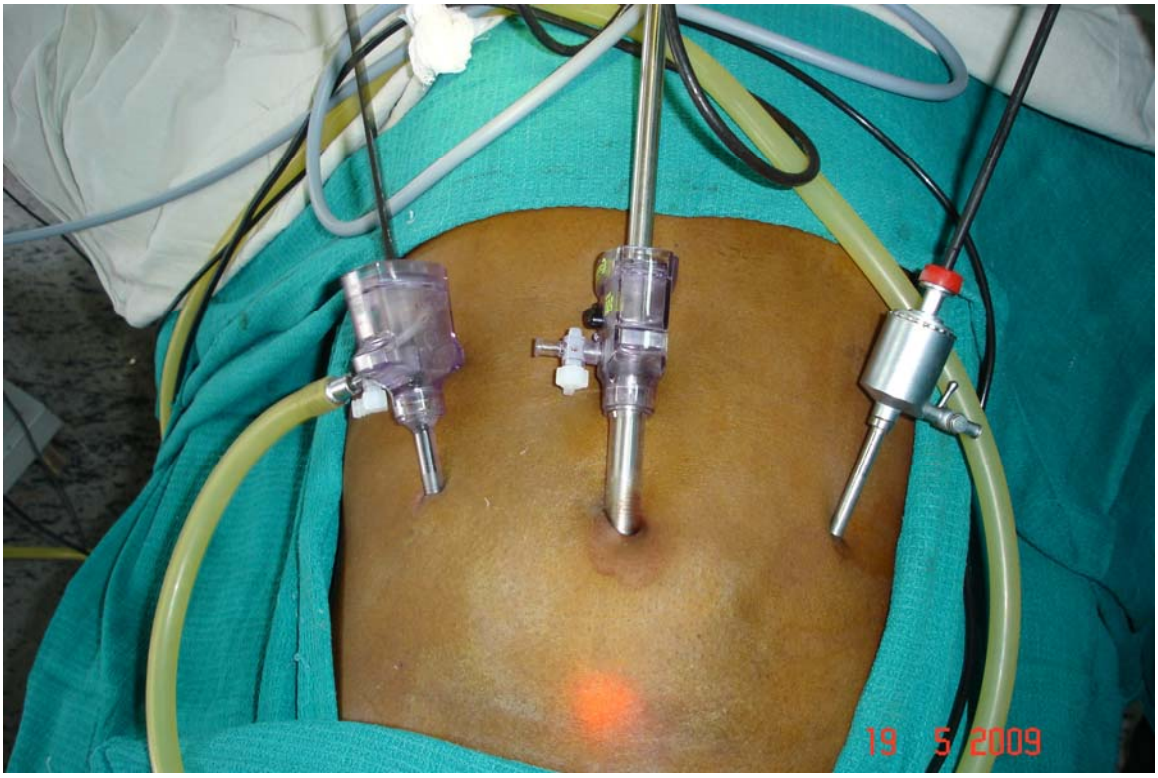
following were assessed

- Surface metastases in liver
- Peritoneal metastases
- visceral serosal surfaces are inspected in a systematic manner for malignant deposits
- If ascitic fluid is present it is aspirated for cytology
- Suspicious lesions(nodules) were biopsied and sent immediately for crush smear cytology examination.

In the absence of obvious metastases, peritoneal lavage was done and fluid aspirated and sent for cytology examination.

Time taken for the procedure is around 20 minutes.

There was no procedure related morbidity or mortality.



DIAGNOSTIC LAPAROSCOPY - TECHNIQUE

Methodology of peritoneal cytology

200ml of normal saline is instilled into peritoneal cavity.Fluid was aspirated from the pelvis ,paracolic gutter and from sub-diaphragmatic spaces on either side.Minimum 75ml of fluid is aspirated from peritoneal cavity and the specimen sent for immediate processing .

The entire specimen was certrifuged at 1500rpm for 5minutes.Then the Supernatant is discarded and the cell pellet re-suspended.Smear preparation are made from the suspension.slide staining is done with haematoxylin and eosin.

Peritoneal cytology/fluid aspirational cytology:

Purpose: to improve the staging of tumour

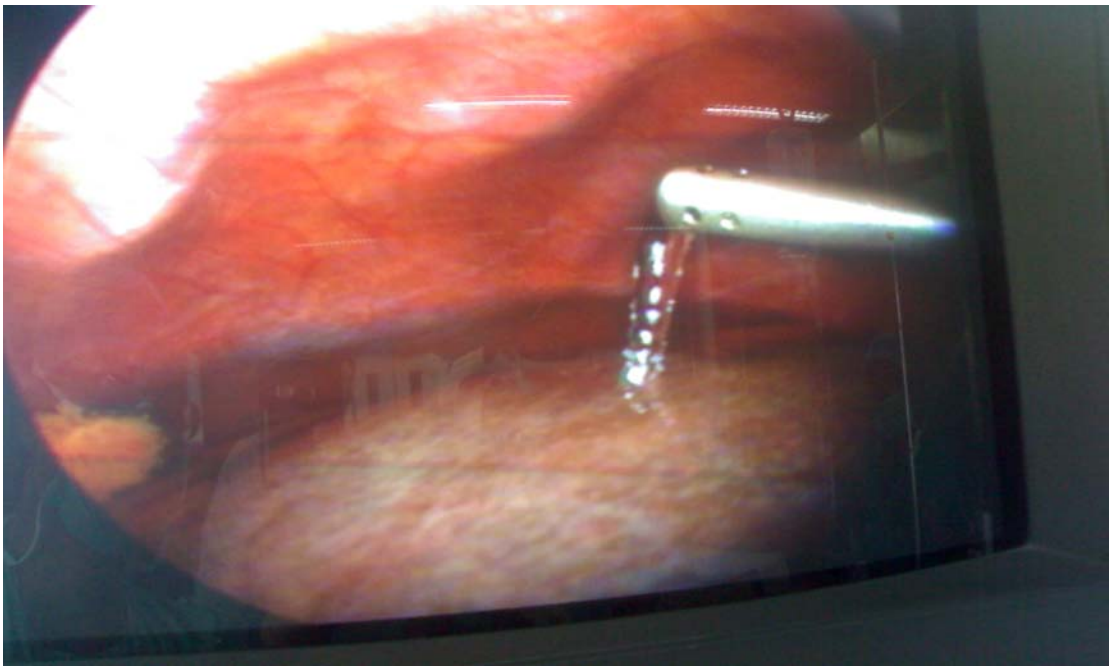
Lavage Techinque:

Instillation of 200 ml of normal saline into peritoneal cavity

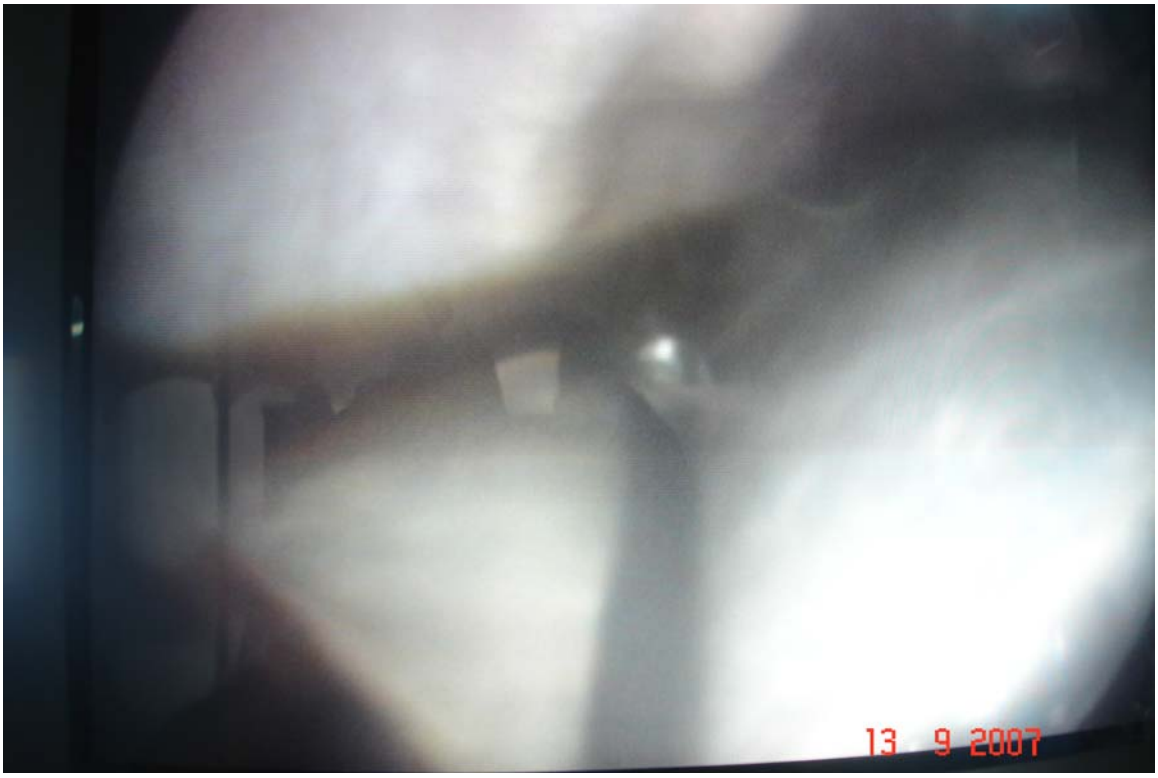
Minimum 75 ml of Fluid is aspirated from the peritoneal cavity and subjected for analysis.

Steps to avoid False Negative Test:

- specimen preservation should be ideal.
- submitted with fixative without substantial delay, or unfixed smears
- preparation by inexperienced personnel is avoided.



PERITONEAL LAVAGE FOR CYTOLOGY



ASCITIC FLUID ASPIRATION FOR CYTOLOGY

PERITONEAL WASHING CYTOLOGY PROCESSING:

Washings collected from normal saline solution is centrifuged at

1500rpm for 15minutes

↓

Supernatant is discarded

↓

Deposit smeared in slide and air dried

↓

It is fixed in isopropyl alcohol

↓

After drying, it is stained with hematoxylin staining for 5-7minutes

↓

washed with running tap water

↓

Dipped in 0.5% acid alcohol for a second

↓

washed with running tap water

slide immersed for bluing for 20 minutes

slide is then dipped in eosin for 1 minute

washed again in running water

air dried

mounted in DPX mounting fluid

Results interpreted.

PROCESSING OF CRUSH SMEAR CYTOLOGY

Tissue –fresh specimen(small fragments)

Crushed between two glass slides

Fixed in 95% ethanol (to maintain cytomorphology) for 10 minutes

Immersed in Harris hematoxylin (10-20minutes)

One dip in acid alcohol(to remove excess stain)

Washed in running water and leave it for bluing (10-15mnts)

Blotted and dipped in eosin and washed

⬇

It is dried

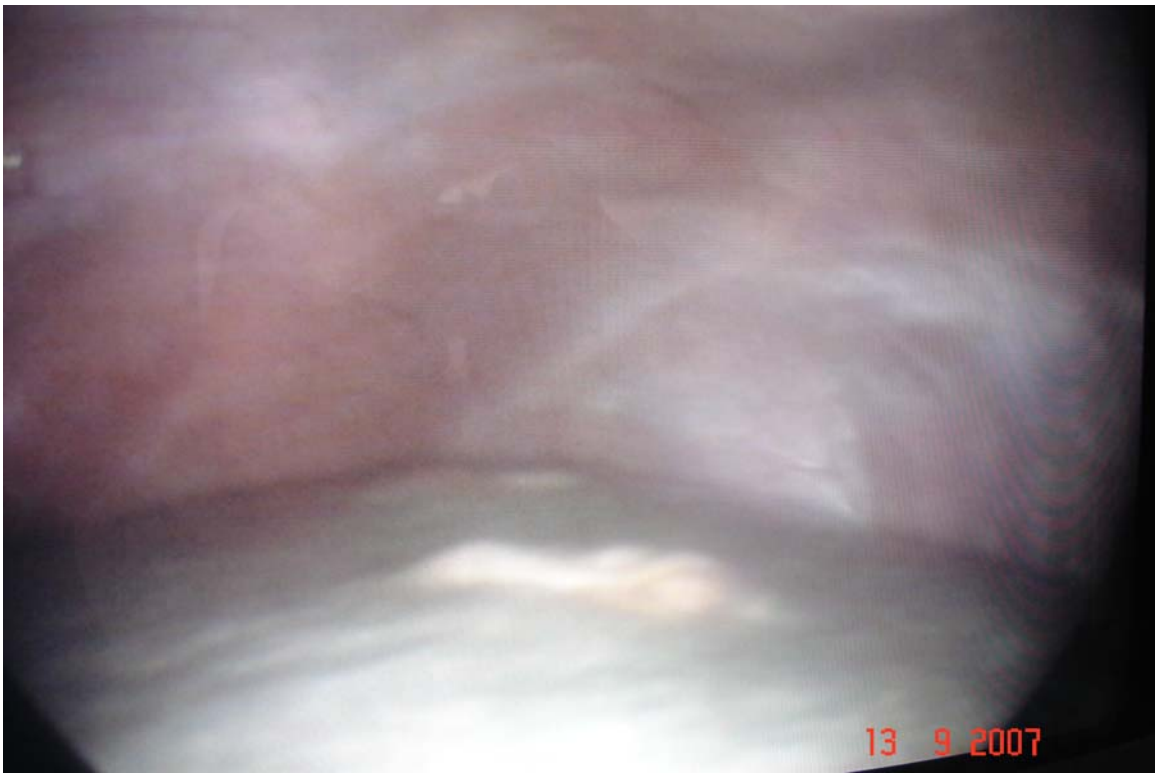
⬇

Backside of the slide is cleaned with tissue paper

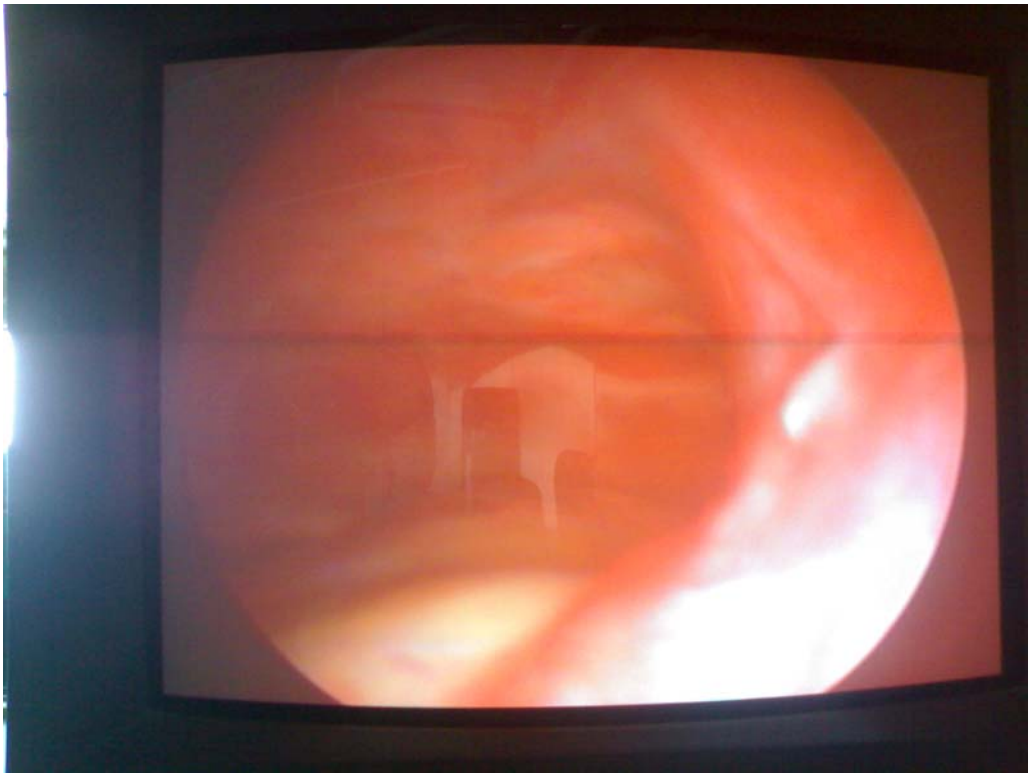
⬇

Mounted in DPX(Distrene Plasticizer Xyline) fluid.

Time taken for the processing is around 40 minutes. Sensitivity of this test is 98%, almost as sensitive as frozen section histology.



LIVER SURFACE METASTASES



METASTASES OVER FALCIFORM LIGAMENT

PERITONEAL NODULE BIOPSY FOR CRUSH SMEAR CYTOLOGY

Statistical Analysis

The data were entered and analysis done with the help of SPSS package and the detection rate and P value were extracted.Fisher exact test applied appropriately and P value calculated.

CHAPTER VI

RESULTS AND DISCUSSION

Demographic profiles

Characteristics of study population

In the Fig.1 Of the 19 patients screened by Diagnostic laparoscopy for periampullary carcinoma, 37% were females and 63% were males.

In Fig.2,representing periampullary carcinoma patients males and females in the 30-35 age group were 1 each.There was 1male and 2 females in 40-45 age group.In the 45-50 age group there was one male.There were equal numbers of males and females i.e.2 each in the age group 50-55 years.In the age groups 55-60 years there were 2 males and 2 females respectively.

In the Fig.3,representing Klatskin Tumor patients, 50% were males and 50% were females.

In the Klatskin Tumor group,(Fig.4) there was one one male in the 30-35 years age group and 1 female in the 35-40 years age group.There was 1 female in 40-45 age group.1 male and 1 female were in the 45-50 age group.In the 55-60 age group there was 1 male.

In Gallbladder carcinoma,of all the patients screened, 40% were females and 60% were Males (Fig.5).

Fig .6 represents all the cases screened for carcinoma gall bladder. 1male was in th age group of 50-55,1 female was in the age group of 55-60,one male and female each were in the age group of 60-65 and 1 male was in 65-70 age group.

In Fig.7, of all the patients included in the study 43% were females and 57% were males.

In Fig .8 of all the cases participated in the study males within 30-35 age group were 2 and females within 35-40 age group was 1.There were 2 males and 3 females within 40-45 age group and 1 male and 2 females in the 45-50 age group.Males and females within 50-55 age group were 3 and 2 respectively.Male and female in the 55-60 age group were equal in number i.e. 3 in each group.There were 5 males and 2 females in the 60-65 age group.1 male belonged to 65-70years age group.

Two patients had endoscopic biliary stent inserted pre operatively.

None of the patients had procedure related morbidity or mortality.

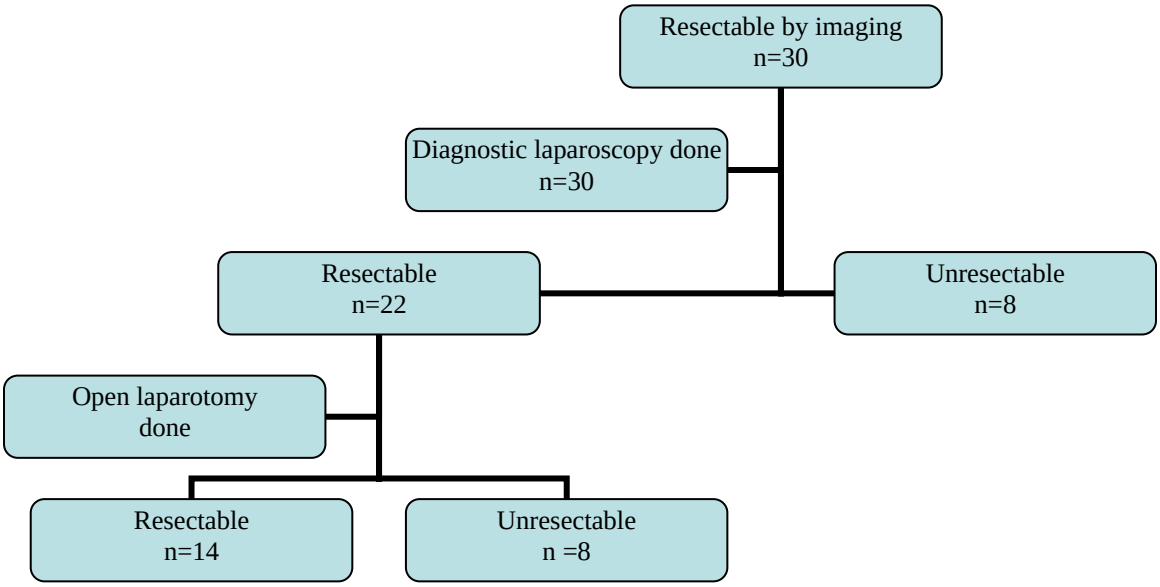
Pre-incisional laparoscopy revealed metastatic tumour spread to the liver in 4 cases and peritoneal metastases in 3 cases.Peritoneal cytology was positive in 1 case.

Biopsy material was obtained and metastatic carcinoma was confirmed by crush cytology.

Laparoscopy failed to identify locoregional tumour unresectability which subsequently was detected during open exploration in 8 cases.

When surface metastases and peritoneal cytology alone was taken into account,there was no false negative cases.

Predictability of resectability by staging laparoscopy in 30 patients with extrahepatic biliary malignancy.



Periampullary carcinoma-metastases detected with Diagnostic laparoscopy

sex	positives	negatives
male	3(15.78%)	9(47.36%)
female	1(5.26%)	6(31.57%)

Table 1

Of the total 19 patients , 12 males and 7 females were subjected to D-lap to detect surface metastases.3 males(15.78%) and 1 female(5.26%) were found to be positive for metastases.9 males(47.36%) and 6 females(31.57%) were found to be negative for metastasis.

Klatskin tumour-metastases detected with Diagnostic laparoscopy

sex	positives	negatives
male	2(33.33%)	1(16.66%)
female	0	3(50 %)

Table 2

Of the total 6 patients,3 males were screened with D-lap.33.33% were found to be positive and 16.66% were found to be negative for metastases.All 3 females (50%) were found to be negative for metastases.

Carcinoma gall bladder-metastases detected with Diagnostic laparoscopy

sex	positives	negatives
male	2(40%)	1(20%)
female	0	2(40 %)

Table 3.

Of the total 5 patients,who were screened with D-lap,2(40%) males were found to be positive for metastases.1 male(20%) and 2 females (40%) were negative for metastases.

Extrahepatic biliary and periampullary carcinoma-metastases detected by Diagnostic laparoscopy.

sex	positives	negatives
male	7(23.33%)	10(33.33%)
female	1(3.33%)	12(40 %)

Table 4

Of the 30 patients screened with D-lap,7(23.33%)males were found to be positive,1(3.33%)female was found to be positive.10(33.33%)males were found to be negative and 12(40%) females were negative.

OVERALL RESULTS OF STAGING LAPAROSCOPY

	Metastases(+ ve)	Metastases(-ve)	Total
Positive	8	0	8
Negative	0	22	22

Table 5

True positives=8 False positive=0
True negatives=22 False negative=0

Overall sensitivity,specificity and positive predictive value of diagnostic Laparoscopy in this study.

Specificity =100%

Sensitivity =100%

Positive predictive value=100%

Comparision of periampullary and other extrahepatic biliary malignancy to identify any difference in detection of metastatic disease.

	Metastases –ve	**Metastases +ve**	**TOTAL**
Periampullary	15	4	19
Other extra hepatic biliary malignancies	7	4	11
	22	8	30

Table 6

P>.05 NS(not statistically significant)

Reasons for unresectability at operation

Periampullary carcinoma

- Interaortocaval node involvement-2 cases

Klatskin Tumor

- Involvement of proper hepatic artery-1 case
- Celiac node involvement-1 case
- Main Portal Vein abutment-1 case

Gall bladder carcinoma

- Involvememt of MPV -3 cases

Demographic profiles

Characteristics of study population

Sex of patients in screening of periampullary carcinoma

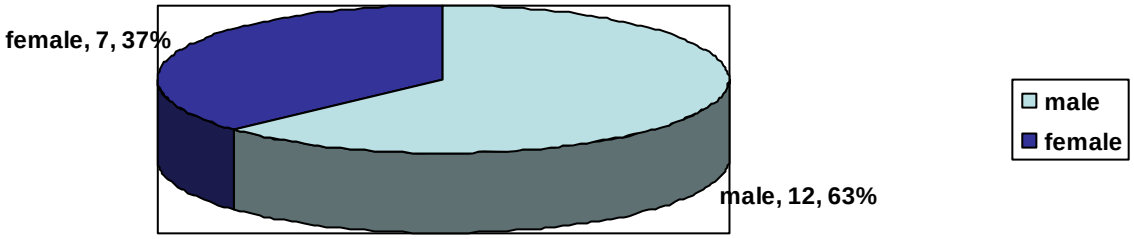


Fig. 1

Age distribution of patients screened for periampullary carcinoma

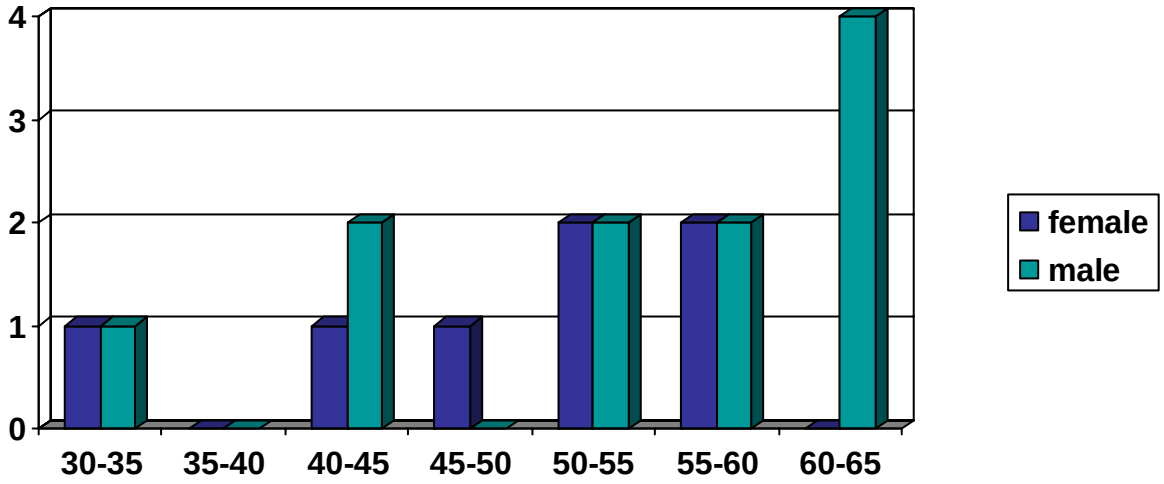


Fig 2.

Sex of patients screened for klatskin tumour

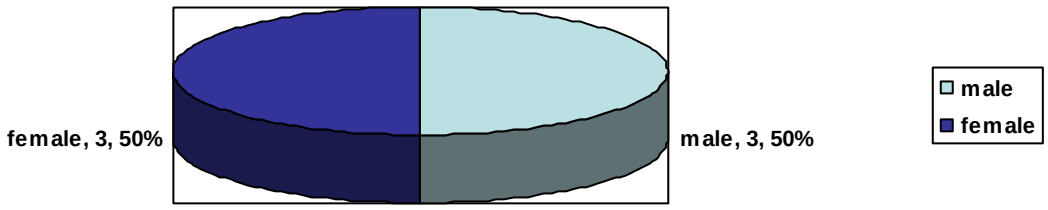


Fig .3

Age distribution of patients screened for klatskin tumour

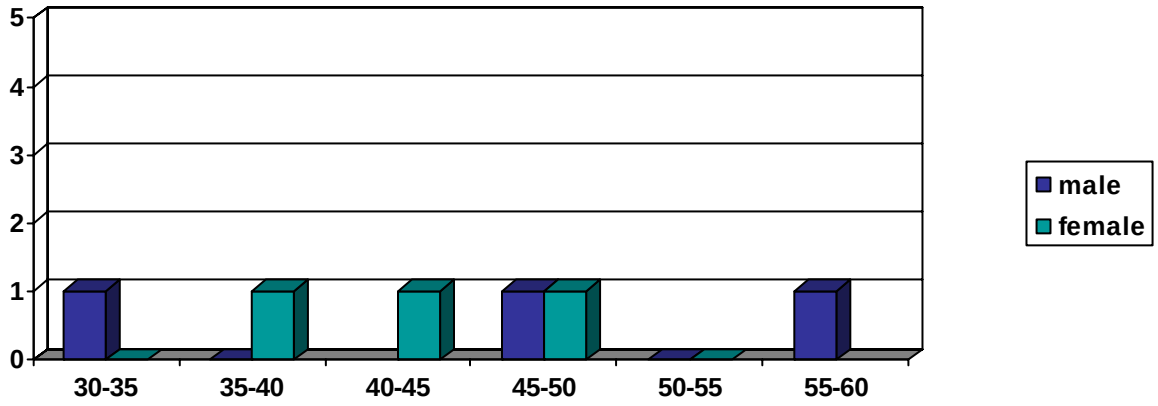


Fig.4

Sex distribution of patients screened for carcinoma gall bladder

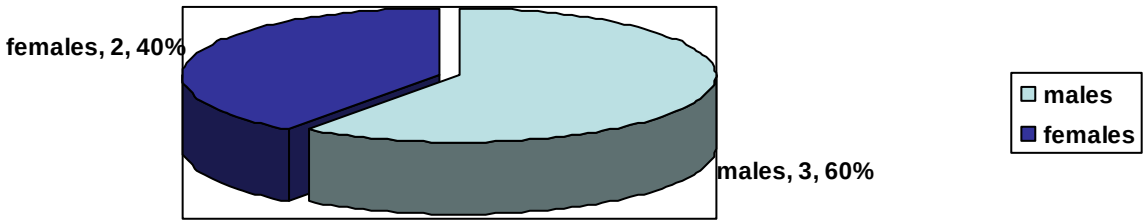


Fig .5

Age distribution of patients screened for Carcinoma gall bladder

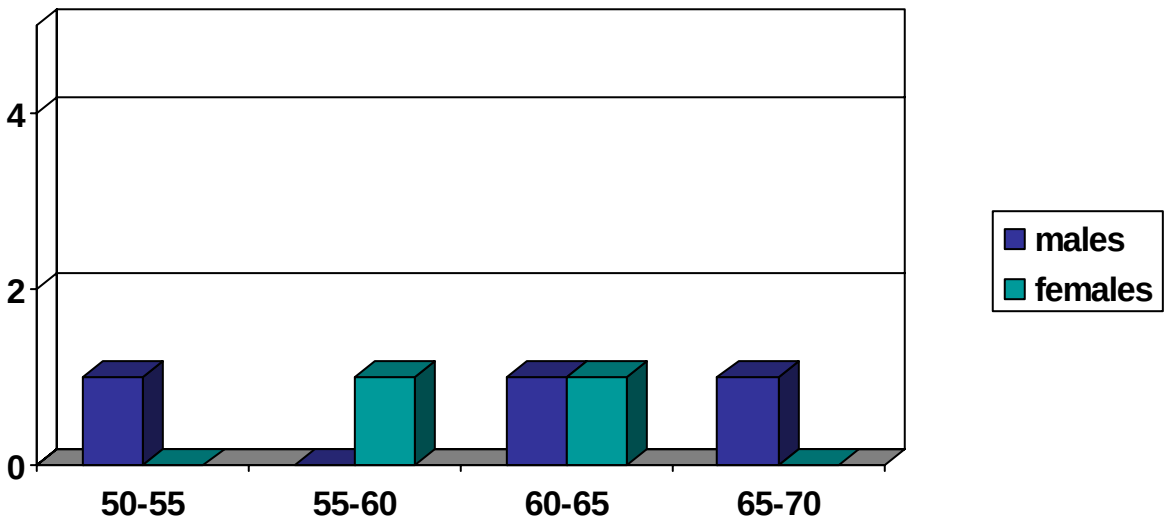


Fig.6

Sex distribution for all the patients included in this study

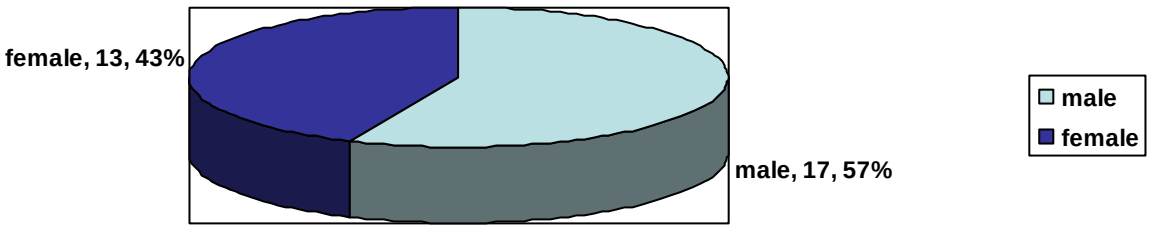


Fig .7

Age distribution for all the patients suspected for extrahepatic biliary malignancies who participated in the study

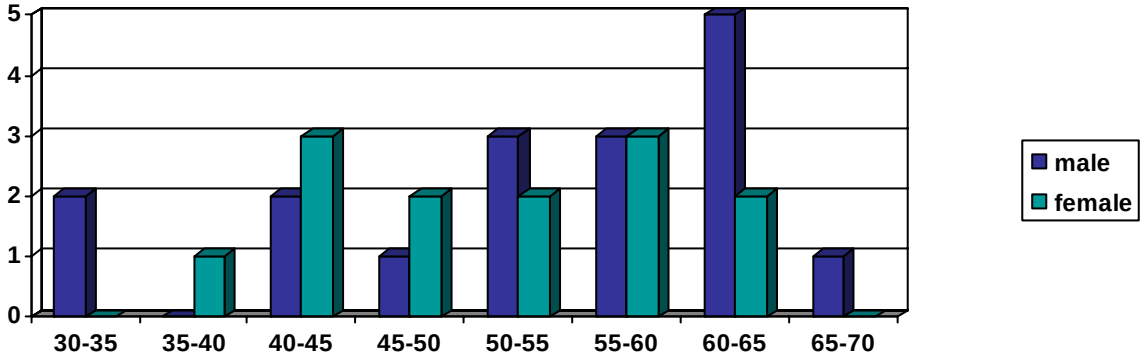


Fig.8

Periampullary cancer resectable/unresectable cases

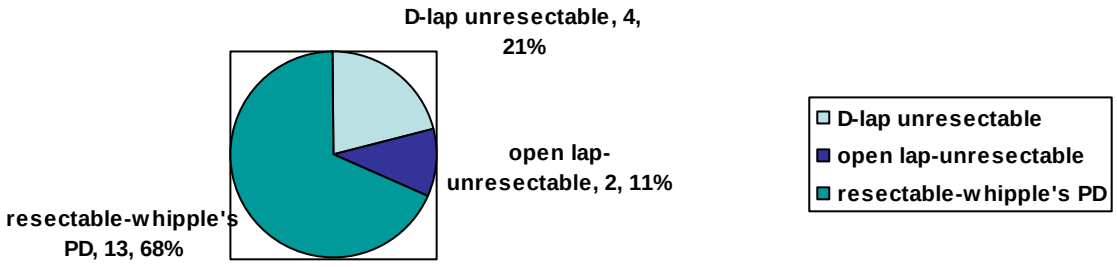


Fig .9

Klatskin tumour resectable/unresectable cases

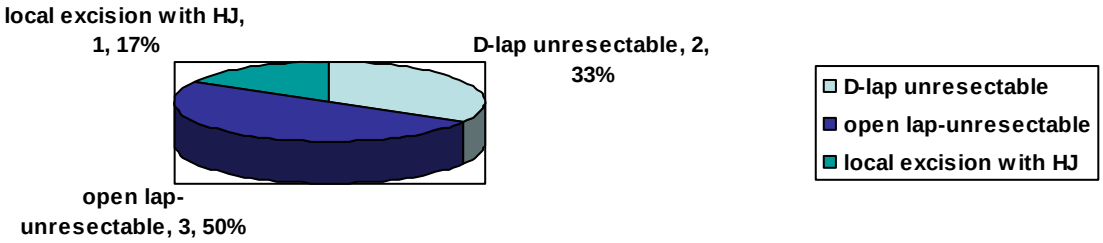


Fig.10

Resectable/unresectable cases in gall bladder malignancy

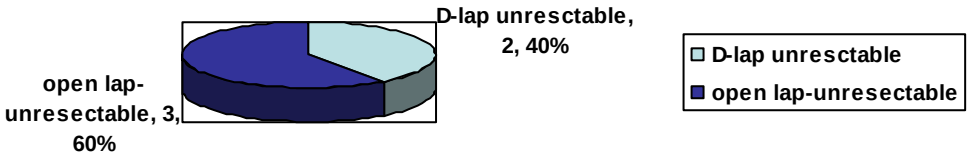


Fig .11

Total resectable/unresectable cases in extra hepatic malignancy

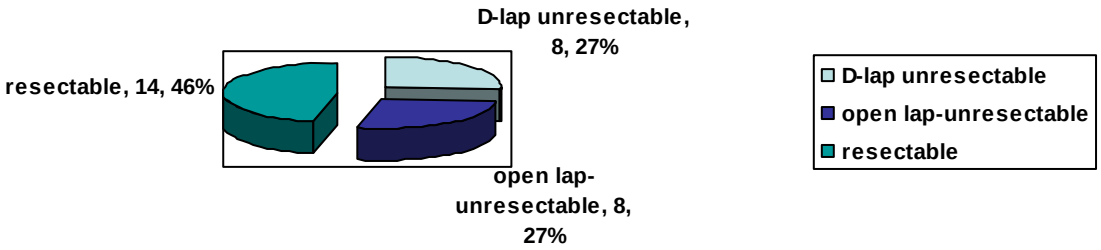


Fig.12

CHAPTER VII

SUMMARY

CHAPTER VII

SUMMARY

Extrahepatic biliary malignancies including cholangiocarcinoma,gallbladder carcinoma and periampullary carcinoma,when unresectable has a median survival of 5-11months.Even after extensive pre-operative evaluation,occult unresectable disease is discovered at the time of exploratory laparotomy in many patients.Because of the prolonged recovery time and survival in patients undergoing laparotomy for unresectable disease,many centers have been evaluating the role of staging laparoscopy in patients with primary and secondary liver tumors.The advantages of detecting unresectable disease at laparoscopy include not only the shortened recovery time and improved quality of life,but also the shorter time to initiation of non-operative therapy.

The detection of unresectable disease mainly depends on the pattern of tumor spread.Since gallbladder carcinoma usually presents at an advanced stage,detection of liver and peritoneal metastasis is higher than other extrahepatic biliary malignancies.This is depicted in this study with a detection rate of 40% for gallbladder malignancy.Whereas periampullary carcinoma,which presents early will have a low detection rate.This study has shown a detection rate of 21%.

The present study was performed on 30 patients diagnosed to have obstructive jaundice due to periampullary carcinoma,klatskin tumour and carcinoma gall bladder in the age group range 31-66 years .Resectability of the tumour was assessed pre operatively with USG abdomen ,CECT abdomen ,MRI with MRCP Doppler with duplex scanning.

Pre incisional laparoscopy was done for all the 30 cases to look for liver surface,peritoneal,serosal and pelvic metastasis .Ascitic fluid if present was aspirated and sent for cytology evaluation .suspicious metastatic nodules were biopsied and sent to crush smear cytology.peritoneal washing cytology was done in cases were there was no obvious metastasis and ascites .

The study has revealed that out of 19 cases of periampullary carcinoma 4 cases were found to have metastatic disease 21.05%. in that there were 3 males (15.78%) and 1 female case (5.26%).Staging laparoscopy did not reveal unresectable disease in 2 cases.Whipple's pancreaticoduodenectomy was done for remaining 13 cases i.e.68% (Fig.9)

Out of the total of 6 patients with klatskin tumour, 2 cases had positive metastatic disease by diagnostic laparoscopy 33.33% .Both cases were males.Laparotomy

was done and unresectable disease was detected in 3 cases(50%).Local excision of the tumor with Roux en y hepaticojejunostomy was performed in 1 case(17%) (Fig.10).

Diagnostic laparoscopy done in 5 cases of carcinoma of the gallbladder revealed metastatic disease in 2 cases(40%).Open laparotomy performed for the remaining 3 cases with an intention to do extended cholecystectomy failed, due to local infiltration to major vessels.Hence palliative segment III bilioenteric anastomosis was done in 2 cases.1 case was subjected to Percutaneous Transhepatic Biliary Drainage in the post-operative period (Fig.11).

Overall, out of 30 cases with extrahepaatic biliary malignancies ,8 cases were found to have metastatic disease by staging laparoscopy (26.66%).
The resectability rate in this study was 46.6% ie 14 cases out of 30 cases.The remaining 8 cases were unresectable due to non-regional nodal involvement ,major vessel abutment and encasement.Use of laparoscopic ultrasonography would have avoided laparotomy even in those 8 cases found to be unresectable due to locoregionally advanced disease at laparotomy (Fig.12).
Extrahepatic biliary malignancies(Klatskin and gallbladder carcinoma) was compared with periampullary carcinoma to detect any real difference in detecting

the metastatic disease by using Fischer Exact test(Table 6).P valve was >0.05(not statistically significant).This indicates staging laparoscopy should be utilized routinely for all cases of extrahepatic biliary and periampullary carcinoma.

When all extrahepatic malignancies are clubbed, staging laparoscopy has shown a 26% of detection rate.

When periampullary carcinoma group alone is considered,detection rate is much less i.e.21% which is almost the same as quoted in previous studies [29,30].Probably the detection rate for periampullary carcinoma can be increased,if it is done for patients with high risk of metastatic disease. This will include those patients with high T stage disease, locally advanced disease and patients with nondefinitive radiographic criteria for unresectability.As of now combining a good quality MDCT and Endoscopic ultrasonogram will provide the T stage,nodal status and locoregionally advanced disease.

CHAPTER VIII

RECOMMENDATIONS

CHAPTER VIII

RECOMMENDATIONS

1. It is recommended to perform staging laparoscopy to detect metastatic disease in extrahepatic cholangiocarcinoma, periampullary carcinoma and gall bladder malignancy.This procedure will prevent unnecessary laparotomy in upto 30% of patients[31].This study has revealed a metastatic detection rate 26.6%.

2.Adding Laparoscopic ultrasonogram to staging laparoscopy will further improve the detectability rate especially for the locoregionally advanced cases,which will preclude resection[32].

3.Surgical bypass may not be necessary for all cases due to short survival of only 6-7 months in metastatic disease.These patients may be better palliated with an endoscopic or percutaneous biliary drainage alone avoiding a major laparotomy.

4.A selective approach may also be adopted for staging laparoscopy,especially for those who have presented with periampullary carcinoma,who will not benefit from surgical palliation.It will be a more cost-effective approach and future studies should be performed to identify such patients.

BIBLIOGRAPHY

BIBLIOGRAPHY

1. Greene RT et al.,Cancer statistics 2001.Cancer J clin 51:15-36.

2. Carrriga MT,Henson DE.Liver,Gallbladder,Extrahepatic bileducts and Pancreas.Cancer 75:171-190.1995

3. Nakeeb A, Pitt HA, Sohn TA, Coleman J, Abrams RA, Piantadosi S, Hruban RH, Lillemoe KD, Yeo CJ, Cameron JL. Cholangiocarcinoma. A spectrum of intrahepatic, perihilar, and distal tumors. Ann Surg. 1996 Oct;224(4):463-73; discussion 473-5

4. Jarnagin WR. Cholangiocarcinoma of the extrahepatic bile ducts. Semin Surg Oncol. 2000 Sep-Oct;19(2):156-76.

5. Carrriga MT,Henson DE.Liver,Gallbladder,Extrahepatic bileducts and Pancreas.Cancer 75:171-190.1995.

6. Neoptolemos JP, Talbot IC, Carr-Locke DL, Shaw DE, Cockleburgh R, Hall AW, Fossard DP. Treatment and outcome in 52 consecutive cases of ampullary carcinoma. Br J Surg. 1987 Oct;74(10):957-61.

7. Howe JR, Klimstra DS, Moccia RD, Conlon KC, Brennan MF. Factors predictive of survival in ampullary carcinoma. Ann Surg. 1998 Jul;228(1):87-94.

8. Yeo CJ. The Whipple procedure in the 1990s. Adv Surg. 1999;32:271-303.

9. Jimenez RE, Warshaw AL, Fernandez-Del Castillo C. Laparoscopy and peritoneal cytology in the staging of pancreatic cancer. J Hepatobiliary Pancreat Surg. 2000;7(1):15-20.

10. Jimenez RE, Warshaw AL, Rattner DW, Willett CG, McGrath D, Fernandez-del Castillo C. Impact of laparoscopic staging in the treatment of pancreatic cancer. Arch Surg. 2000 Apr;135(4):409-14; discussion 414-5

11. Lo CM, Lai EC, Liu CL, Fan ST, Wong J. Laparoscopy and laparoscopic ultrasonography avoid exploratory laparotomy in patients with hepatocellular carcinoma. Ann Surg. 1998 Apr;227(4):527-32.

12. Nieveen van Dijkum EJ, Romijn MG, Terwee CB, de Wit LT, van der Meulen JH, Lameris HS, Rauws EA, Obertop H, van Eyck CH, Bossuyt PM, Gouma DJ. Laparoscopic staging and subsequent palliation in patients with peripancreatic carcinoma. Ann Surg. 2003 Jan;237(1):66-73

13. Pisters PW, Lee JE, Vauthey JN, Charnsangavej C, Evans DB. Laparoscopy in the staging of pancreatic cancer. Br J Surg. 2001 Mar;88(3):325-37

14. White R, Winston C, Gonen M, D'Angelica M, Jarnagin W, Fong Y, Conlon K, Brennan M, Allen P. Current utility of staging laparoscopy for pancreatic and peripancreatic neoplasms. J Am Coll Surg. 2008 Mar;206(3):445-50. Epub 2007 Nov 26

15. Hennig R, Tempia-Caliera AA, Hartel M, Büchler MW, Friess H. Staging laparoscopy and its indications in pancreatic cancer patients. Dig Surg. 2002;19(6):484-8

16. Nieveen van Dijkum EJ, Romijn MG, Terwee CB, de Wit LT, van der Meulen JH, Lameris HS, Rauws EA, Obertop H, van Eyck CH, Bossuyt PM, Gouma DJ. Laparoscopic staging and subsequent palliation in patients with peripancreatic carcinoma. Ann Surg. 2003 Jan;237(1):66-73

17. Litynski GS.Highlights in the History of Laparoscopy.Frankfurt,Germany:Barbara Bernert Publishers,1996.

18. Palanivelu C.Art of Laparoscopic Surgery.Textbook and Atlas,Vol. 1,Jaya Publications 2005.

19. Fernández-del Castillo C, Rattner DW, Warshaw AL. Further experience with laparoscopy and peritoneal cytology in the staging of pancreatic cancer. Br J Surg. 1995 Aug;82(8):1127-9.

20. Conlon KC, Dougherty E, Klimstra DS, Coit DG, Turnbull AD, Brennan MF. The value of minimal access surgery in the staging of patients with potentially resectable peripancreatic malignancy. Ann Surg. 1996 Feb;223(2):134-40

21. Fukuda M,Mima F,Nakano Y.Studies in echolaparoscopy.Scan J Gastroenterol.17 1982(Suppl.78):186.

22. John TG, Garden OJ. Laparoscopic ultrasonography: extending the scope of diagnostic laparoscopy. Br J Surg. 1994 Jan;81(1):5-6

23. Callery MP, Strasberg SM, Doherty GM, Soper NJ, Norton JA. Staging laparoscopy with laparoscopic ultrasonography: optimizing resectability in hepatobiliary and pancreatic malignancy. J Am Coll Surg. 1997 Jul;185(1):33-9

24. D'Angelica M, Fong Y, Weber S, Gonen M, DeMatteo RP, Conlon K, Blumgart LH, Jarnagin WR. The role of staging laparoscopy in hepatobiliary malignancy: prospective analysis of 401 cases. Ann Surg Oncol. 2003 Mar;10(2):183-9.

25. Conlon KC, Brennan MF. Laparoscopy for staging abdominal malignancies. Adv Surg. 2000;34:331-50.

26. Friess H, Kleeff J, Silva JC, Sadowski C, Baer HU, Büchler MW. The role of diagnostic laparoscopy in pancreatic and periampullary malignancies. J Am Coll Surg. 1998 Jun;186(6):675-82

27. Andrén-Sandberg A, Lindberg CG, Lundstedt C, Ihse I. Computed tomography and laparoscopy in the assessment of the patient with pancreatic cancerJ Am Coll Surg. 1998 Jan;186(1):35-40

28. Spitz FR, Abbruzzese JL, Lee JE, Pisters PW, Lowy AM, Fenoglio CJ, Cleary KR, Janjan NA, Goswitz MS, Rich TA, Evans DB. Preoperative and postoperative chemoradiation strategies in patients treated with pancreaticoduodenectomy for adenocarcinoma of the pancreas. J Clin Oncol. 1997 Mar;15(3):928-37.

29. Brooks AD, Mallis MJ, Brennan MF, Conlon KC. The value of laparoscopy in the management of ampullary, duodenal, and distal bile duct tumors. J Gastrointest Surg. 2002 Mar-Apr;6(2):139-45; discussion 145-6

30. Vollmer CM, Drebin JA, Middleton WD, Teefey SA, Linehan DC, Soper NJ, Eagon CJ, Strasberg SM. Utility of staging laparoscopy in subsets of peripancreatic and biliary malignancies. Ann Surg. 2002 Jan;235(1):1-7

31. Sohn TA, Lillemoe KD, Cameron JL, Huang JJ, Pitt HA, Yeo CJ. Surgical palliation of unresectable periampullary adenocarcinoma in the 1990s. J Am Coll Surg. 1999 Jun;188(6):658-66; discussion 666-9.

32. John TG, Greig JD, Carter DC, Garden OJ. Carcinoma of the pancreatic head and periampullary region. Tumor staging with laparoscopy and laparoscopic ultrasonography. Ann Surg. 1995 Feb;221(2):156-64.

ANNEXURES

ANNEXURES

MASTER CHART

	NAME	AGE/SEX	IP No.	DIAGNOSIS	LAPAROSCOPY FINDINGS
1	MUNUSAMY	45/M	4116	Periamp. Carcinoma	no mets
2	PICHAYAMMAL	48/F	48680	Periamp. Carcinoma	serosal mets
3	VANASUNDARI	45/F	48026	Periamp. Carcinoma	no mets
4	VENU	61/M	32657	Periamp. Carcinoma	liver mets
5	ANBU	54/M	67670	Periamp. Carcinoma	no mets
6	KUMARI	60/F	86989	Periamp. Carcinoma	no mets
7	VARADHAN	43/M	10162	Periamp. Carcinoma	no mets
8	RAJESWARI	60/F	15637	Periamp. Carcinoma	lavage cytology-+ve
9	SRINIVASAN	60/M	31476	Periamp. Carcinoma	no mets
10	MUTHUSAMY	65/M	59365	Periamp. Carcinoma	liver/peritoneal mets
11	SEVAGAN	60/M	81128	Periamp. Carcinoma	no mets
12	SHANKER	33/M	64238	Periamp. Carcinoma	no mets
13	ANJALAI	35/F	82919	Periamp. Carcinoma	no mets
14	PANJALAI	51/F	82681	Periamp. Carcinoma	no mets
15	SHANMUGAIAH	57/M	96787	Periamp. Carcinoma	no mets
16	PERUMAL	62/M	95034	Periamp. Carcinoma	no mets
17	KUMARAN	55/M	35476	Periamp. Carcinoma	liver mets
18	MURUGESAN	62/M	21646	Periamp. Carcinoma	no mets
19	MALLIGA	52/F	18245	Periamp. Carcinoma	no mets
20	SHANKER	31/M	57665	Klatskin Tumor	no mets
21	BHARANI	40/F	71762	Klatskin Tumor	no mets
22	KRISHNAN	48/M	26631	Klatskin Tumor	liver/peritoneal mets
23	KANNIAMMAL	45/F	87650	Klatskin Tumor	no mets
24	ARJUNAN	58/M	28209	Klatskin Tumor	lavage cytology-+ve
25	VALLI	48/F	76532	Klatskin Tumor	no mets
26	BHASEERAHMED	55/M	73441	Carcinoma Gallbladder	peritoneal mets
27	NAINA	66/M	86367	Carcinoma Gallbladder	liver mets
28	PATTAMMAL	60/F	37402	Carcinoma Gallbladder	no mets
29	RAJENDRAN	65/M	10862	Carcinoma Gallbladder	no mets
30	KUMARI	63/F	64378	Carcinoma Gallbladder	no mets

PROFORMA

NAME:

AGE/SEX: **DATE OF ADMISSION:**

HOSPITAL IP No: **DATE OF D-LAP:**

CLINICAL DIAGNOSIS:

INVESTIGATIONS:

USG ABDOMEN:

CECT ABDOMEN:

LFT : TOT.BIL: DIR: INDIR: PT/INR:
SGOT: SGPT: ALP:
TOT PRO: ALB: GLOB:

D-LAP FINDINGS: ***LIVER METS:***

PERITONEAL METS:

LOCAL INVASION:

LYMPH NODES:

CURATIVE SURGERY:

PALLIATIVE PROCEDURE