Annals of International Medical and Dental Research
E-ISSN: 2395-2822 | P-ISSN: 2395-2814
Vol-8, Issue-6 | November- December 2022
DOI: 10.53339/aimdr.2022.8.6.7
Page no- 46-54 | Section- Research Article (Surgery)

The Outcome of Patients with Different Pancreatic Tumors Treated by Whipple's Operation at Bangabandhu Sheikh Mujib Medical University

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Received: 31 July 2022
Revised: 27 September 2022
Accepted: 07 September 2022
Published: 22 October 2022

Abstract

Background: Whipple's Operation was first introduced by Allan Whipple in the 1930s. During 1960s and 1970's the mortality rate for the Whipple operation was very high. Pancreatic tumors are one of the important indications for Whipple's operation. About 85% of patients had adenocarcinoma tumor of the pancreas. 15% of patients had other tumors in the head region. In the Whipple's operation the head of the pancreas, a portion of the bile duct, the gallbladder and the duodenum is removed. The aim of the study was to find the outcome of patients with different benign and malignant pancreatic tumor who undergone Whipple's surgery and compare the preoperative finding and postoperative complication. **Material & Methods:** This study was a cross-sectional observational study which was carried out at the Department of Hepatobiliary and Pancreatic Surgery in Bangabandhu Sheikh Mujib Medical University (B.S.M.M.U), Dhaka, Bangladesh. The study was conducted during the period of August 2010 to July 2012. There were a total of 20 cases. **Results:** 100% having solid pseudo papillary tumor age below 35yrs. After Whipple's operation for solid pseudo papillary tumor of the pancreas, or benign tumor group, 25% of patients had developed wound infection. But in the case of Whipple's operation for adenocarcinoma pancreas, 62.25% of patients developed wound infection. At a follow-up after 1 year of Whipple's surgery, none of the benign tumor cases needed readmission, as all 100% had normal liver function tests, normal levels of CA 19-9, and normal USG findings in the abdomen. On the other hand, 25% of the malignant tumor cases had some form of complication and needed readmission. **Conclusion:** Most pancreatic tumors were located in the head of the pancreas which can be treated by Whipple's operation. Adenocarcinoma of the head is the most common indication of surgery and is surgically resect able.

Keywords:- Pancreatic tumor, Whipple's Operation, Carcinoma.

INTRODUCTION

The Whipple's Operation was first described in the 1930's by Allan Whipple. In the 1960's and 1970's the Mortality rate for the Whipple Operation was very high. Up to 25% of patients died from the surgery.[1] This experience of the 1970's is still remembered by some Physicians

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who are reluctant to recommend the Whipple operation. In the Whipple's operation the head of the pancreas, a portion of the bile duct, the gallbladder and the duodenum is removed. Occasionally a portion of the stomach may also be removed. After removal of these structures the remaining pancreas, bile duct and the intestine is sutured back into the intestine to direct the gastrointestinal secretions back into the gut.[2] Pancreatic tumors are one of the important indication for Whipple's operation. Approximately 85% patients have very aggressive type of tumor called adenocarcinoma of the pancreas.[3] In about 15% of patients other tumors in the pancreas are found in the head region that are less aggressive types of tumors which are curable by Whipple's operation.[4] An evaluation in a center that is experienced in the treatment of pancreatic cancer is important for determining appropriate treatment for pancreatic tumors. The most common type of cancer of the pancreas is an adenocarcinoma which is a tumor that arise from the cells that the duct of the pancreas. Approximately 30,000 new cases of pancreatic adenocarcinoma are diagnosed each year and approximately 28,000 patients die from pancreatic cancer each year.[5] Only about 20 to 40% of patients with adenocarcinoma of the pancreas have a tumor that is confined to the pancreas at the time of diagnosis.[6] Other benign tumors of head of pancreas are also treated by Whipple's operation. The tumor types that are found in this group include: cystic tumors or neoplasms including mucinous cyst adenoma, solid pseudo papillary tumor of pancreas and serous cyst adenoma, islet cell tumors (also called neuroendocrine tumors), papillary cystic neoplasms, lymphoma of the pancreas, acinar cell tumors of the pancreas, metastatic tumors to the pancreas.[7] The majority of these tumors are non-malignant or benign, however even malignant tumors have five year survival rates in the order of 40 to 80% depending on the tumors type. In view of the excellent outcome, aggressive surgical therapy is indicated for these tumors, and the part of the pancreas that is affected by the tumor is removed.[8]

Objective of the Study

The objective of this study was to find the outcome of patients with different benign and malignant pancreatic tumor who undergone Whipple's surgery and compare the preoperative finding and postoperative complication.

MATERIAL AND METHODS

This study was a cross-sectional observational study which was carried out at the Department of Hepatobiliary and Pancreatic Surgery in Bangabandhu Sheikh Mujib Medical University (B.S.M.M.U), Dhaka, Bangladesh. The study was conducted during the period of August 2010 to July 2012. There were a total of 20 cases who were selected by purposive sampling technique according to the inclusion and exclusion criteria. The study patients were divided into two groups based on the malignancy of pancreatic cancer. Written consent was obtained from all participants or their legal guardians after making them aware of the study purpose. The ethical approval was obtained from the ethical review committee of the hospital authority. Necessary data was collected through face-to-face interviews using a data collection sheet, and collected data were

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recorded and analyzed using SPSS software version 21.

Inclusion Criteria

- Patients with pancreatic tumor who had undergone Whipple's operation

Exclusion Criteria

- Non-Pancreatic tumor cases
- Patients affected with other chronic diseases etc.

RESULTS

[Figure 1] shows all 4 patients (100%) having solid pseudo papillary tumor age below 35yrs. But among patients having adenocarcinoma pancreas 12(75%) patients age between 45-65yrs & 4 patients (25%) age between 35-44yrs.
[Figure 2] shows that all 3(75%) patents having solid pseudo papillary tumor are female and 1(25%) patient is male. But among patients having adenocarcinoma pancreas 12(75%) patients are male and 4 (25%) patients are Female.

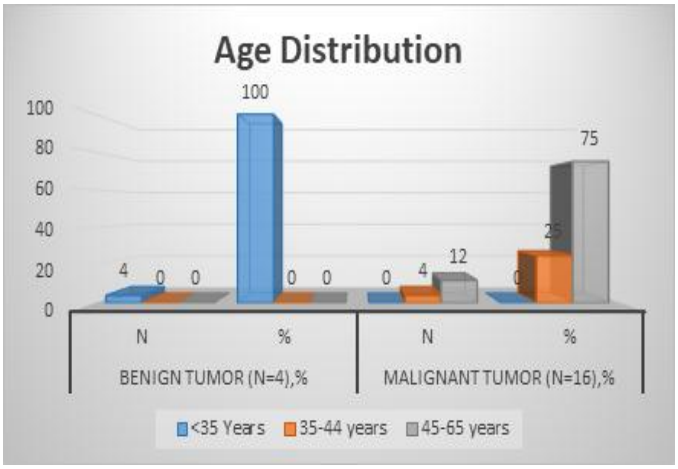

Figure 1: Age distribution of the participants [N=20]

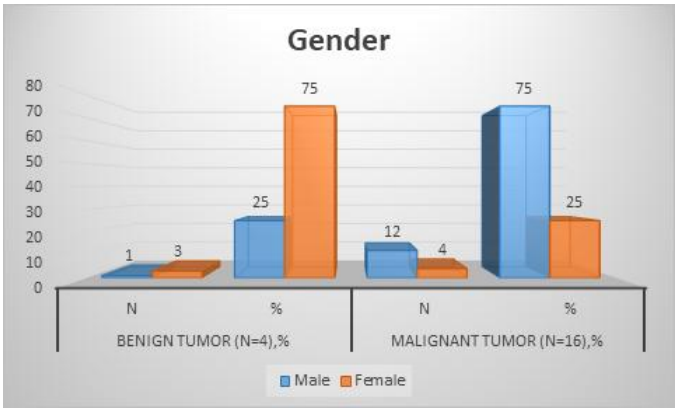

Figure 2: Gender distribution of the participants

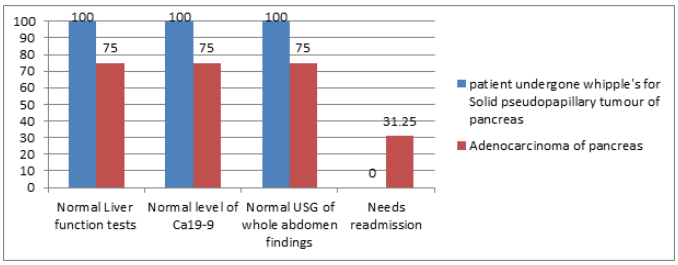

Figure 3: Comparative results of study subjects based on follow up reports of 6month to1 year after Whipple's surgery

[Table 1] shows 100% patient having malignant pancreatic tumor complains yellowish eye color, H/O passing pale stool, loss of appetite, weight loss & passing high color urine, 87.5% complains itching, 37.5% complains vomiting &12.5% complains abdominal pain. But in case of patient having benign pancreatic tumor 100% patient complains abdominal pain, 25% patient complains yellowish eye color , H/O passing pale stool, passing high color urine. No complains of weight loss, loss of appetite & itching among patient having benign pancreatic tumor.
[Table 2] On clinical examination 100% patient having malignant pancreatic tumor had jaundice, anemia, 80% had palpable gallbladder. But no patient had palpable

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abdominal lump. In case of benign pancreatic tumor 100% patient had palpable abdominal lump, 25% patient are jaundiced & anemic. 25% patient had palpable gallbladder.

[Table 3] showing patient having benign pancreatic tumor 50% patient had Hb10gm/dl<, 25% has S.bilirubin >1.2gm/dl, S.Alk Phosphatase>126U/L but 0% had S.albumin3.55gm/dl<&CA19.9>40U/ml. But in case of patient having malignant tumor 100% patient had Hb10gm/dl<, S.bilirubin>1.2gm/dl, CA19.9>40U/ml, S.Alk Phosphatase>126U/L but 87.5% had S.albumin3.55gm/dl< & prothrombin time >15 secs.

[Table 4] On CT scan 100% benign pancreatic tumor site was head region of pancreas, 100% tumor size was >5cm, 25% had intra & extra hepatic biliary tree dialated & enlarge gallbladder. But in case of malignant pancreatic tumor 100% tumor arises from pancreatic head but 0% tumor size >3cm.100% had intra & extra hepatic biliary tree dialated and 93.75% patient had enlarge gallbladder.

[Table 5] After Whipple's operation for solid pseudo papillary tumor of the pancreas, or benign tumor group, 25% of patients had developed wound infection. But in the case of Whipple's operation for adenocarcinoma pancreas, 62.25% of patients developed wound infection, 43.75 % patients developed wound gap, 25% patient developed a chest infection, 12.5% patient developed pancreatic fistula, gastro paresis, and 6.25% patient developed anastomotic leakage.

[Table 6] At a follow-up after 1 year of Whipple's surgery, none of the benign tumor cases needed readmission, as all 100% had normal liver function tests, normal levels of CA 19-9, and normal USG findings in the abdomen. On the other hand, 25% of the malignant tumor cases had some form of complication and needed readmission.

[Figure 3] shows the patients who were undergone Whipple's operation for solid pseudo papillary tumor of pancreas, 100%patient has normal LFts, Normal Ca19.9 level & normal USG findings & no patient needs readmission within 1year.But patients who are undergone Whipple's surgery for adenocarcinoma, 80% patient has normal LFTs, Normal Ca19.9 level, Normal USG findings.31.25% patient needs readmission.

Table 1: Distribution of study participants by chief complaints [N=20]

Chief Complaints	Benign Tumor (n=4),%	Malignant Tumor (n=16),%
Yellowish Eye Color	1, 25%	16, 100%
Passing pale stool	1, 25%	16, 100%
Abdominal Pain	4, 100%	2, 12.5%
Itching	0, 0%	14, 87.5%
Vomiting	1, 25%	6, 37.5%
Loss of appetite	0, 0%	16, 100%
Weight Loss	0, 0%	16, 100%
High Color Urine	1, 25%	16, 100%

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Table 2: Comparative results of study subjects by clinical examination findings [N=20]

Clinical Findings	Benign Tumor (n=4),%	Malignant Tumor (n=16),%
Jaundice	1, 25%	16, 100%
Anemia	2, 50%	16, 100%
Palpable Gallbladder	1, 25%	13, 81.25%
Palpable Abdominal Lump	4, 100%	0, 0%

Table 3: Comparative results of study subjects by investigations [N=20]

Investigative Findings	Benign Tumor (n=4),%	Malignant Tumor (n=16),%
Hb <10 gm/dl	2, 50%	16, 100%
S. Bilirubin >1.2 mg/dl	1, 25%	16, 100%
Prothrombin Time >15 Secs	0, 0%	14, 87.5%
S.Alkaline Phosphatase >126U/L	2, 25%	16, 100%
S. Albumin <3.5 gm	0, 0%	14, 87.5%
CA19.9>40U/ml)	0, 0%	16, 100%

Table 4: Comparative results of study subject by CT scan findings [N=20]

CT Scan Findings	Benign Tumor (n=4),%	Malignant Tumor (n=16),%
Tumor Size >5 cm	4, 100%	0, 0%
Tumor at the Head of the pancreas	4, 100%	16, 100%
Dilated Intra & extra hepatic biliary tree	1, 25%	16, 100%
Enlarged gallbladder	1, 25%	15, 93.75%

Table 5: Comparative results of study subjects by postoperative complication after Whipple's operation [N=20]

Post-Operative Complication	Benign Tumor (n=4),%	Malignant Tumor (n=16),%
Wound Infection	1, 25%	10, 62.5%
Wound Gap	0, 0%	7, 43.75%
Pancreatic Fistula	0, 0%	2, 12.5%
Gastroparesis	0, 0%	2, 12.5%
Chest Infection	0, 0%	4, 25%
Anastomotic Leakage	0, 0%	1, 6.25%
Death	0, 0%	0, 0%

Table 6: Comparative results of study subjects based on follow-up reports of 1 year after Whipple's surgery: [N=20]

1-year follow-up	Benign Tumor (n=4),%	Malignant Tumor (n=16),%
Normal Liver Function Test	4, 100%	12, 75%
Normal levels of Ca 19-9	4, 100%	12, 75%
Normal USG findings of the abdomen	4, 100%	12, 75%
Needs Readmission	0, 0%	4, 25%

DISCUSSION

Whipple's operation is indicated for a variety of benign and malignant pancreatic tumor. It is most commonly (85%) performed for adenocarcinoma arising in the head of the pancreas. In our series among 20 patients 16(80%) patient has undergone for Whipple's

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operation for adenocarcinoma of head of pancreas. Other 4(20%) patient has done Whipple's operation for solid pseudo papillary tumor of pancreas which arises from pancreatic head. Incidence of pancreatic carcinoma is more in men than women and age is >45 years are more common.[6] In our series 12(75%) patients having adenocarcinoma pancreas are male and 4 (25%) patients are female & 12(75%) patients age between 45-65yrs & 4 patients (25%) age between 35-44yrs. More than 70% of people with pancreatic adenocarcinoma eventually experience some abdominal pain as the tumor grows. Pancreatic cancer can cause a dull ache in the upper belly and back pain.[7] It was also observed that patients in the malignant tumor group had a higher prevalence as age increased.[8] This suggests that benign tumors can metastasize with age, which was supported by findings of other studies.[9,10] More than 75% occur in the head of the pancreas and classically present with painless, progressive obstructive jaundice. The urine is dark because of the high level of conjugated bilirubin and the absence of urobilinogen. The stool is pale because of the lack of stercobilinogen in the bowel. In addition to jaundice, rising bilirubin levels can cause severe itching. 30% patient having adenocarcinoma head of pancreas gives history of unexplained weight loss and loss of appetite. Weight loss may be caused or exacerbated by anorexia, diarrhea, or early satiety. In a recent study of 195 patient having resect able pancreatic adenocarcinoma, Yeo CJ, Cameron JL et al reported that 100% patient complain yellowish eye color, weight loss, loss of appetite and H/O passing pale color stool and high color urine,74% itching, 18% abdominal pain ,42% vomiting & on clinical examination 100% patient were jaundiced, 90% were anemic, 75%patient had palpable abdominal lump.[2] In our series patients having malignant pancreatic tumor (adenocarcinoma pancreas) all 16 patients (100%) complain yellowish eye color, weight loss, loss of appetite, h/o passing pale stool & h/o passing high color urine. Only 2 patients (12.5%) complain abdominal pain& 14(87.5%) patients complain itching, 6 patients (37.5%) complains vomiting. On clinical examination all 16(100%) patients are jaundiced & anemic, 12 (80%) patients have palpable gallbladder but no patient have abdominal lump. Solid pseudo papillary tumor of the pancreas are rare (1%–2% of exocrine pancreatic tumors). The abdomen is usually nontender on palpation, but obstructive symptoms may occur if the tumor grows large enough to compress adjacent viscera. 9 year (2001-2009) study of solid pseudo papillary tumor of pancreas in surgery dept. of B.S.M.M.U has been reported by Z.R.Khan et al. It is reported that 31 patients were diagnosed as solid pseudo papillary tumor.[11] Among them 77.4% patients are female, 22.6% were male. Median age 24(14-44). More than 90% patient present with vague abdominal pain and abdominal lump. In our series 3(75%) patents having solid pseudo papillary tumor are female & 1patient (25%) is male and all patient age is below 35 yrs. All 4 patients (100%) complains abdominal pain. All 4(100%) patients have palpable abdominal lump. Accurate diagnosis of the special type of pancreatic tumor is obviously important. ERCP guided tissue biopsy & CT guided Fine-needle aspiration biopsy are needed for definitive diagnosis. Kazuei Ogoshi et al has reported that 98% of 77 patient has been detected positive for pancreatic malignancy preoperatively tissue biopsy by ERCP.[12] Among 20 patients we have done tissue biopsy by ERCP for 16 patients &

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histopathology reveals adenocarcinoma and CT guided FNAC for 4 patients as patients has palpable abdominal lump & histopathology reveals papillary type cells. In case of solid pseudo papillary tumor there are usually no abnormalities in clinical laboratory tests (eg, serum bilirubin, S.alkaline phosphatase levels) or in pancreatic cancer marker CA19–9. Among patient having benign solid pseudo papillary tumor 2 patients (50%) have Hb level less than 10gm/dl,1 patient (25%) have S.bilirubin level> 1.2mg/dl, S.alkaline phosphatase>126U/L. All other investigation reveals normal. But among patient having malignant pancreatic tumor (adenocarcinoma) all16 patients (100%) have Hb 10 gm/dl <, S.Bilirubin (>1.2mg/dl), CA 19-9 >40 U/ml but 14 patients (87.5%), Prothrombin Time>15 secs & S.albumin 3.5gm/dl<. USg can determine the level of obstruction in most cases (sensitivity >90%). USG has an overall sensitivity of 75%. However in many cases USG will as the only imaging test for diagnosis and staging from other cystic neoplasms (eg, serous cyst adenomas, mucin). In our series among patients having benign solid pseudo papillary tumor of pancreas all 4 (100%) patients have solid hypo echoic mass>3cm on USG of whole abdomen, 1patient (25%) has dialated intra & extra hepatic biliary tree dialated & distended gallbladder. But among patients malignant pancreatic tumor (adenocarcinoma) all 16 (100%) patients have dialated intra & extra hepatic biliary tree, distended gallbladder on USG of whole abdomen. On USG of whole abdomen no patient has Solid hypo echoic mass measuring. While CT is excellent in detecting pancreatic tumors (>90% accuracy), it frequently stages true tumor site, size, extent and even with early helical CT, the accuracy for assessing resect ability was around 80%.[4] With the use of newer multislice helical CT scanners, tumor detection rates have improved to around 90–95%. The most recent studies using multislice scanners have shown that positive predictive values for resect ability are slightly above 90%.[5] In our series CT scan whole abdomen for patients having benign solid pseudo papillary tumor shows all 4 patients(100%) pancreatic tumor arises from pancreatic head, size>3cm, well encapsulated tumor and tumor is free from other structures, 1 patient (25%) has distended gallbladder & dialated CBD and intrahepatic biliary tree but no patient has ascites &abdominal lymphadenopathy. But in case of solid pseudo papillary tumor CT scan shows 100% tumor arises from pancreatic head, 100% tumor size >3cm. The Whipple's operation is a complex operation with a high chance of developing complications if the surgeon performing the surgical procedure has limited experience in this operation.[13] In an international study of 130 Whipple's operation in a multicenter is reported by Strasburg et al in 1997. In that study postoperatively pancreatic fistula 15%, gastro paresis 14%, wound infection 24%, wound gap 19%, chest infection 10% and anastomotic leakage 4% was noted. In our series Whipple's for adenocarcinoma pancreas postoperatively 10 patient (62.5%) have wound infection, 5 patients (31.25.%) have wound gap, 2 patients(12.5%) have gastro paresis, pancreatic fistula, 4 patient (25%) have chest infection & 1 patient (6.25%) has anastomotic leakage which is much higher rate of that study. In other study in B.S.M.M.U Z.R.khan et al reported a study of 23 patient where 25.9% patient had wound infection, 4.43% basal atelectasis.[11] In our series only 1 patient (25%) has wound infection. The overall survival after

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the Whipple's operation for pancreatic adenocarcinoma is about 20% at five years after surgery. Patients without spread of cancer into their lymph nodes may have up to a 40% survival.[14] The operation is usually 100 % curative in patients with benign or low grade tumors of the pancreas.[12] All 4 patients (100%) who are undergone Whipple's surgery for benign solid pseudo papillary tumor of pancreas have Normal LFTs, Normal USG findings & Normal USG of whole abdomen reports. Thus no patient needs readmission. But patients who are undergone Whipple's for adenocarcinoma head of pancreas 12 patient (75%) have LFTs, Normal USG findings & Normal USG of whole abdomen reports, 4 patient (25%) need readmission.

CONCLUSIONS

Pancreatic tumors are mostly located in the head of pancreas which can be treated by Whipple's operation. Adenocarcinoma of the head of the pancreas is considered to be the most common indication of Whipple's operation. The most common clinical features of carcinoma head of pancreas are jaundice, weight loss, anorexia, passing pale color stool, palpable gallbladder. Whereas for benign pancreatic tumor patients, abdominal pain and jaundice are more prominent signs. Solid pseudo papillary demonstrated encapsulated tumor on CT scan that is actually a positive findings for that tumor. For diagnosis and prognosis CA19-9 tumor marker plays a vital role for adenocarcinoma pancreas but not for solid pseudo papillary tumor. Most common complications of Whipple's surgery are wound infections, wound gap, chest infection, pancreatic fistula, gastro paresis. It may also concluded that postoperative complication is also less in benign tumor than malignant pancreatic tumor.

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Annals of International Medical and Dental Research
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Source of Support: Nil, Conflict of Interest: None declared