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Pathological Findings In Whipple Specimens: A Cross Sectional Study In A Tertiary Care Hospital.

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ABSTRACT

Pancreatic cancer (PC), a rare cancer with a high mortality rate. Whipple procedure is a major surgery performed for pancreatic neoplasms, periampullary carcinomas, cholangiocarcinomas and very rarely for benign diseases in tertiary care centers. To analyse the histopathological parameters which include pathological diagnosis and staging of tumours for which Whipple procedure is done. We did this cross-sectional study over a 3-year period at Stanley Medical College, Chennai from the year 2020-2022. Epidemiological parameters, risk factors and data regarding Whipple procedure were retrieved from the registers and medical records of Department of Surgical Gastroenterology and Department of Pathology, Stanley Medical College, Chennai, Tamil Nadu, India. All Whipple procedures done over a 3-year period were included in the study. Statistical analysis was done using R statistical software and the results were tabulated. The data was analyzed using the SPSS software (version 16.0.1). A total of 41 pancreatoduodenectomy specimens were included in this study. The most common site of tumour was periampullary region followed by pancreatic head. Most common malignancy was Grade 2 adenocarcinoma. Mean diameter of the tumour was 2 cm. Tumour stage was done for all the 41 patients and most of them presented at stage 2 with nodal metastasis in 13 patients. This study will highlight the importance of Whipple procedure for Periampullary carcinoma so as to reduce the morbidity and mortality thereby improving the survival of such patients.

Keywords: Whipple procedure, Periampullary carcinoma, pancreatic carcinoma.

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INTRODUCTION

Pancreatic cancers rank 14th globally and 7th in mortality, 24th of all cancers in India and 18th in mortality. Most probable predisposing factors of pancreatic malignancy are smoking and tobacco usage [1]. The risk is directly proportional to the number of pack years.

Allan Whipple was the first to describe Whipple procedure for periampullary carcinoma in the year 1935 [2]. Recently it is done for benign and malignant neoplasms arising from the pancreas and peri-ampullary carcinomas.

Periampullary region is an anatomically complex region involved by cancers arising at the ampulla of Vater, second portion of the duodenum, head of pancreas and distal common bile duct. Periampullary adenocarcinoma accounts to 2% of all gastrointestinal tumours [3] for which pancreaticoduodenectomy is the surgery of choice.

Whipple pancreaticoduodenectomy can be one of the following types

- Classic Whipple procedure which includes distal stomach and pylorus.
- A pylorus preserving operation wherein the duodenum is transected 1-2 cm distal to the pylorus.
- Extended Whipple involves retroperitoneal and aortocaval lymph node dissection [9].

Histopathological evaluation of pancreaticoduodenectomy specimens is of immense value prognostically. Size of the tumour, tumour location, extension, status of surgical margins, perivascular and perineural invasion and lymph node status are the most important prognostic factors and has to be meticulously assessed and documented in each case so as to assess the morbidity and mortality in such patients [9].

In patients with 15-years survival the tumour size was <3 cm compared with a 5-years survival for the patients with a tumour size >3 cm. The overall survival of stage I patients was 47.7% with 15-years survival of 16% [4].

METHODS

A series of Whipple procedures done between the year 2020 to 2022 at Stanley Medical College, Chennai was taken up for this cross-sectional study. All demographic features were analysed and documented. Inclusion criteria include all patients who underwent Whipple procedure between the year 2020 and 2022 at the Department of Surgical gastroenterology and their specimens received at Department of Pathology, Stanley Medical College, Chennai. Exclusion criteria include benign lesions for which Whipple procedure was done and specimens with prior history of neoadjuvant therapy were .

Study population: A total of 41 Whipple specimens done for malignant lesions from January 2020 to December 2022 were taken up for this study.

Methodology

Statistical analysis: Simple descriptive statistical analysis was done by calculating Percentage, Mean, median and Range. The p-value was calculated using Fischer-exact test (SPSS software version 2) and value of <0.05 was considered statistically significant.

RESULTS

A total of 41 cases of Whipple specimens during a 3-year period were analysed and observations recorded. Most of the patients presented with symptoms of jaundice.

Age group in our study ranged from 28 years to 75 years with a mean age of presentation being 52 years [5]. Males outnumbered females, accounting to 58%. The most common tumour site was in periampullary region 54%. Mean tumour size was 2 cm. Most common tumour type was adenocarcinoma, most common grade was grade II. One case of pancreatic neuroendocrine tumour was reported.

The average number of lymph nodes dissected out was 12. 13 out of 41 cases showed nodal metastases. In all cases duodenal, pancreatic margins and common bile duct margins were free of tumour infiltration. Vascular and perineural invasion was not seen in any of the cases. Most of the cases fall in the T2 pathologic staging category followed by T3 stage, 1 case was of T4 stage.

Table 1: Comparison of our study with other studies

Sno	Parameters	Our study	Suneetha et al	Syed et al	Hemat et al	Forough et l
1	Mean age	52 yrs	52yrs	44yr	42-76 yrs	57yrs
2	Male female ratio	M>F	M>F	M:F =1:1	M.F	M>F
3	Most common Tumour site	Periampullary region	Periampullary region	ampullary region	Periampullary region	Periampullary region
4	Tumour size	2 cm		2.4 cm	2.5 cm	2.8 cm
5	Type of tumour	Adenocarcinoma	Adenocarcinoma	Adenocarcinoma	Adenocarcinoma	Adenocarcinoma
6	Grade of tumour	G II	GI	GI	GI	GI
7	Lymph nodes involvement	5%			17%	35%
8	Stage of the tumour	T2	T2	T2	T2	T3

Figure 1: Sex Distribution

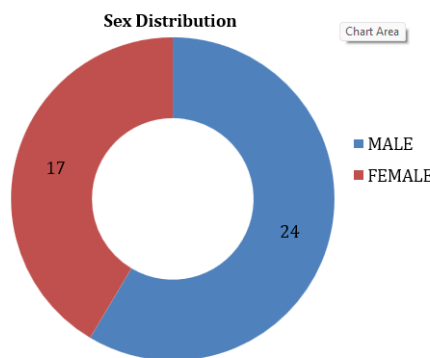


Figure 2: Site Distribution

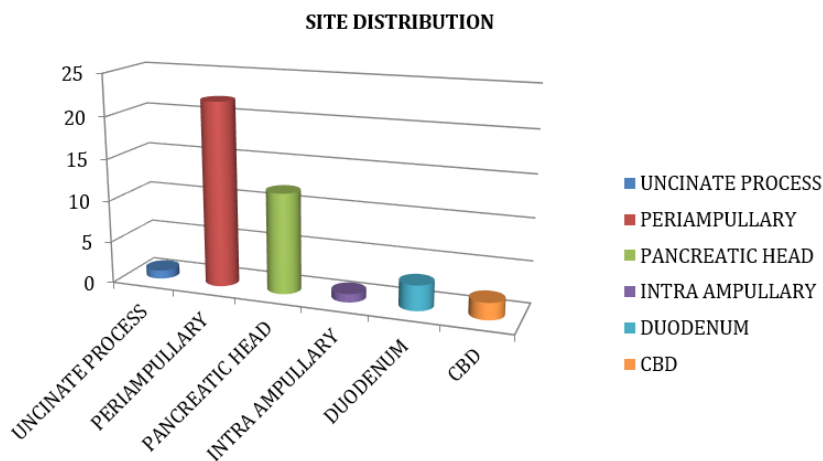


Figure 3: Grade Of The Tumors

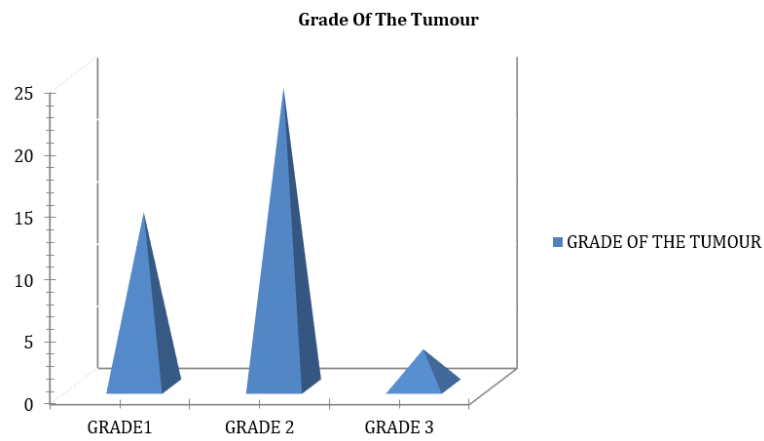


Figure 4: Staging Of Tumors

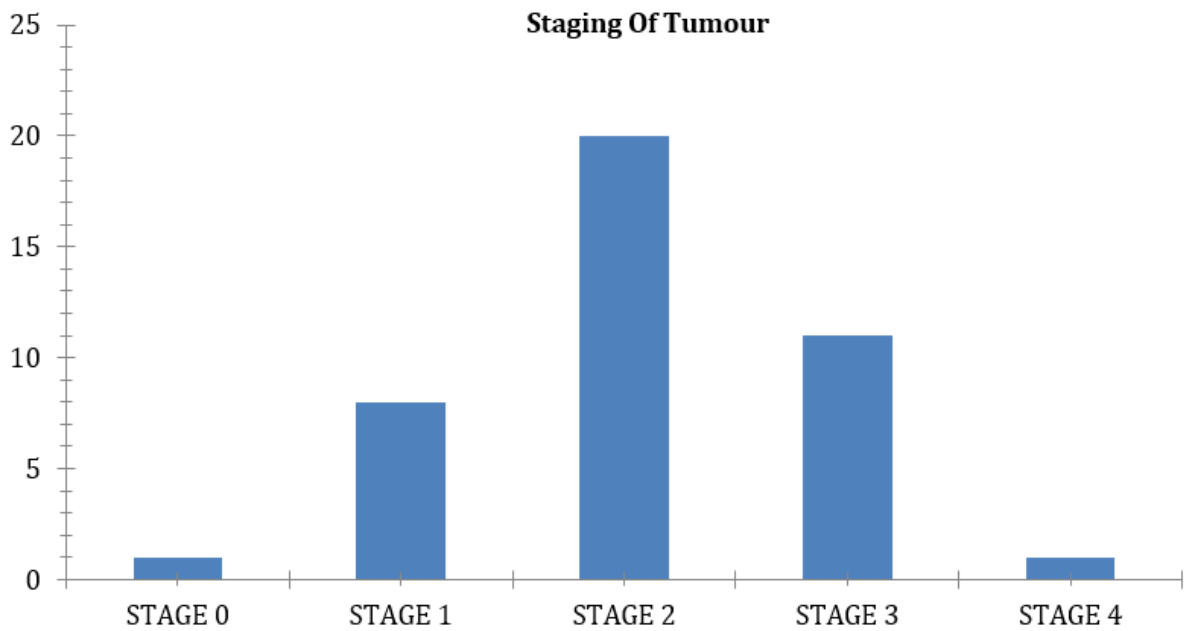


Figure 5: Photograph showing periampullary growth in Whipple specimen.



Figure 6: Photograph showing ulceroproliferative periampullary growth in Whipple specimen.



Figure 7: Photograph showing neuroendocrine tumor of pancreas Whipple specimen.

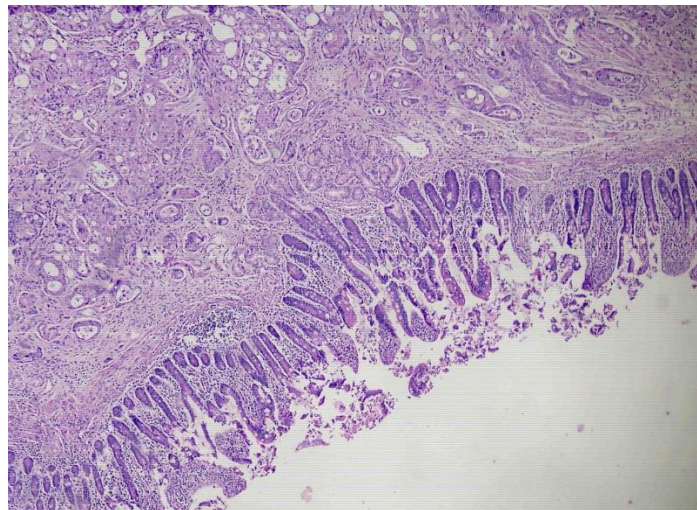


Figure 8: Photomicrograph showing Adenocarcinoma at 100x (Low power view)

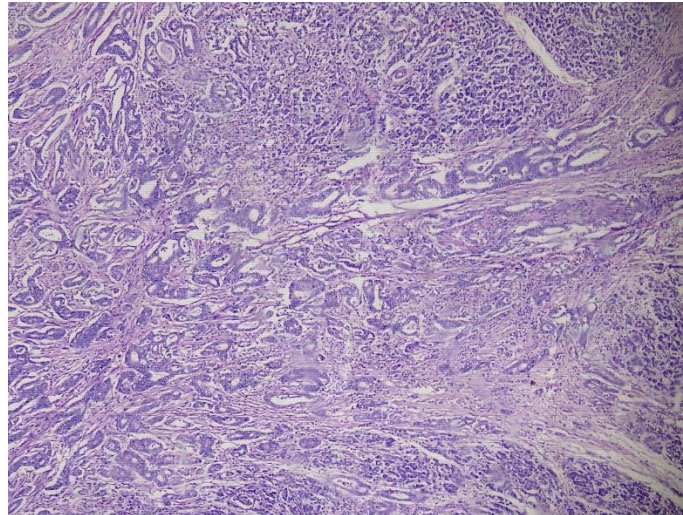


Figure 9: Photomicrograph showing Adenocarcinoma at 100x (Low power view)

DISCUSSION

Periampullary carcinomas are tumours arising within 2 cms of the major papilla in the duodenum. Pancreaticoduodenectomy is the choice of treatment for such tumours. It is being performed for both benign and malignant neoplasms of the pancreas and for cholangiocarcinomas other than for periampullary carcinomas. It is a standardized procedure involving the removal of the duodenum, proximal 15 cms of the jejunum, common bile duct, gall bladder, head of the pancreas and distal gastrectomy. It was once considered as a high mortality rated procedure, but is now being done in many centers with a decline in the mortality rate to less than 5% [6-11].

Morbidity due to Whipple procedure is due to pancreatic fistula, the most common short-term complication. Ascending cholangitis accounts to be the most common long-term complication. Other complications due to this procedure are delayed gastric emptying, hemorrhage, leakage of hepatic and jejunum anastomosis, wound infection and intraabdominal abscess. Amir Saraee et al [5] observed adenocarcinoma as the most common pathology .

Prognosis of the patient depends on size of the tumour, negative lymph nodes, well differentiated histology of the tumour, margin status, adjuvant chemoradiation [12]. Narang et al and Kim et al says along with surgery in cases of nodal positivity adjuvant chemoradiation increases the survival rate [13, 14].

CONCLUSION

This study highlights the significance of the Whipple procedure in diagnosing and managing pancreatic and periampullary tumors, predominantly Adenocarcinomas. The pathological findings underscore that the majority of the tumors were localized in the periampullary region, with a considerable proportion of patients presenting with stage 2 tumors and nodal metastasis. These insights stress the necessity for early detection and intervention to improve prognosis. Moreover, the data emphasizes the critical role of histopathological evaluation in guiding treatment strategies and advancing our understanding of pancreatic cancers clinical behavior and progression. Future research should focus on larger cohorts and integrate molecular profiling to enhance diagnostic precision and therapeutic outcomes.

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