



**ORIGINAL RESEARCH PAPER**

**Radio-Diagnosis**

**STUDY OF ROLE OF CT SCAN IN THE EVALUATION OF PERIAMPULLARY CANCER**

**KEY WORDS: CT**

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**ABSTRACT**

**Introduction:** Imaging in pancreatic diseases is challenging because anatomic location of pancreas in the retroperitoneum and relationship with major blood vessels and bowel. Computed tomography (CT) has been the first imaging modality of choice in case of evaluation of pancreatic pathology. CT as a diagnostic modality is widely used in the staging of pancreatic and periampullary malignancy. However, its accuracy in assessment of extra regional lymph nodes is still unclear. Present study was conducted to evaluate the diagnostic accuracy of CT in assessment of periampullary carcinoma and also in predicting pancreatic tumours resectability **Materials and Methods:** 15 Patients between age group 30 to 75 years with clinical and laboratory findings of pancreatic mass or those came for follow-up & referred to the CT Unit of our hospital were enrolled. After obtaining data on detailed relevant history, general and abdominal examination findings, laboratory and serological examinations results, all the patients were subjected to CT scan. It was performed using a 128 slice CT machine (Toshiba). With multislice CT of pancreas thin slice thickness (1 mm) or less than that acquired during short time of single breath hold. Following findings were taken as CT signs of unresectability: liver metas- tases, ascites, local extension (except duodenum), arterial encasement, venous occlusion, and lymph node enlargement outside the field **Observations and Results:** 9 (60 %) cases margin were ill defined & in 6 (40 %) it was well defined. Hypodense cases were 4 (27 %), hyperdense were 3 (20 %) & mixed were 8 (53 %). 8 (53 %) cases showed homogenous enhancement & 7 (47 %) showed heterogenous. Calcification was present in only 1 (7 %) case. In 3 (20 %) cases lesion was resectable **Conclusion:** In conclusion, CT have a fair diagnostic accuracy in the assessment of pancreatic tumours resectability with sensitivity (100 %), specificity (92.31 %), PPV (66.67 %) and NPV (100 %)

**INTRODUCTION**

Imaging in pancreatic diseases is challenging because anatomic location of pancreas in the retroperitoneum and relationship with major blood vessels and bowel. Periampullary cancer arises from pancreatic head and uncus, lower common bile duct, ampulla of Vater, and periampullary duodenum. Evaluation of ampullary adenocarcinomas and adenomas, duodenal adenocarcinomas, and cholangiocarcinomas is challenging<sup>1,2,3</sup>. Objective of pre-treatment evaluation through imaging mainly aims in differentiating pancreatic from other periampullary cancers. Imaging also helps to detect features which further supports in decision making about treatment/surgical approach. Computed tomography (CT) has been the first imaging modality of choice in case of evaluation of pancreatic pathology<sup>4</sup>. Pancreatic tumours have been classified according to histo-morphology but a CT imaging-based classification system found to be better for differential diagnosis and treatment planning<sup>2,5,6,7,8</sup>. It shows a good correlation between histopathologic and the imaging findings<sup>2</sup>. Pancreatoduodenectomy is the curative treatment in patients with periampullary or pancreatic cancer<sup>9</sup>. Preoperative staging is essential in excluding distant metastases and evaluating potential resectability. Staging of involved extra regional lymph node is important as well, especially in the current era of neoadjuvant treatment. CT as a diagnostic modality is widely used in the staging of pancreatic and periampullary malignancy<sup>10</sup>. However, its accuracy in assessment of extra regional lymph nodes is still unclear. Present study was conducted to evaluate the diagnostic accuracy of CT in assessment of periampullary carcinoma and also in predicting pancreatic tumours resectability.

**AIM**

To evaluate the diagnostic accuracy of CT in assessment of periampullary carcinoma

**OBJECTIVE**

1. To assess CT findings in periampullary carcinoma
2. To predict pancreatic tumours resectability

**MATERIAL AND METHODS**

Present study is a cross sectional study conducted from duration June 2022 to May 2023 in department of radiology, MGM medical college & hospital, Chatrapati Sambhajinagar. Institutional ethics committee permission was taken prior to start of study. 15 patients with pancreatic mass fulfilling inclusion and exclusion criteria were enrolled. Study was explained to all participants and written informed consent was obtained from all.

**Inclusion Criteria**

Patients between age group 30 to 75 years with clinical and laboratory findings of pancreatic mass or those came for follow-up & referred to the CT Unit of our hospital were enrolled

**Exclusion Criteria**

1. Patients with chronic renal impairment
2. Patients with high serum creatinine
3. Patients with allergy to contrast media

**Procedure**

After obtaining data on detailed relevant history, general and abdominal examination findings, laboratory and serological examinations results, all the patients were subjected to CT scan. It was performed using a 128 slice CT machine (Toshiba). Patient was advised low residue diet 24 hour prior and complete fasting for 4 to 6 hours before procedure. Procedure was explained to patient in short & reassured. Patient were examined in supine position and instructed to remain stable during examination. Suspended breathing during scanning time was taken care of. Scan parameters consisted were tube current as 120 kV and 400 mA, slice

thickness as 5 mm, collimation as 0.6 mm, pitch as 0.6, 0.6-s gantry rotation time. Table speed was for one rotation 7.5–10 mm in single breath-hold of 15–25 s. With multislice CT of pancreas thin slice thickness (1 mm) or less than that acquired during short time of single breath hold. Following findings were taken as CT signs of unresectability: liver metastases, ascites, local extension (except duodenum), arterial encasement, venous occlusion, and lymph node enlargement outside the field.

**Statistical analysis**

Statistical analysis was performed using SPSS software, version 20. Data were expressed as frequency with percentages N (%). Sensitivity, specificity, PPV, NPV determined. Appropriate statistical test used to check significance. Statistical significance was assumed if P value less than 0.05.

**OBSERVATION AND RESULT**

**Table 1: Age & gender distribution**

Sr No.	Age (Years)	Male N (%)	Female N (%)	Total N (%)
1	30-45	4 (27 %)	3 (20 %)	7 (47 %)
2	46-60	3 (20 %)	2 (13 %)	5 (33 %)
3	61-75	2 (13 %)	1 (7 %)	3 (20 %)
Total N (%)		9 (60 %)	6 (40 %)	15 (100 %)

As per Table 1 values, 30 to 45 years age group was dominant in-patient prevalence with 7 (47 %) cases followed by 46 to 60 years age group with 5 (33 %) cases.

**Table 2: Histopathological diagnosis**

Sr No.	Diagnosis	Number of cases N (%)
1	Adenocarcinoma	6 (40 %)
2	Ampullary carcinoma	3 (20 %)
3	Intraductal papillary mucinous tumour (IPMN)	1 (7 %)
4	Other Pre-malignancy	1 (7 %)
5	Histologic specimen not obtained	4 (26 %)
Total N (%)		15 (100 %)

As shown in Table 2, Adenocarcinoma was detected in 6 (40 %) cases, Ampullary carcinoma in 3 (20 %), IPMN in 1 (7 %), Other Pre-malignancy conditions in 1 (7 %). In 4 (26 %) cases however no histologic specimen obtained.

**Table 3: CT findings**

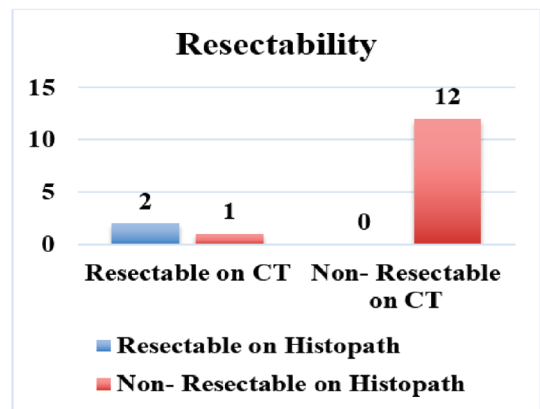
Sr No.	CT findings	Number of cases N (%)
1	Margin	
	a. Ill defined	9 (60 %)
	b. Well-defined	6 (40 %)
	Density	
2	a. Hypodense	4 (27 %)
	b. Hyperdense	3 (20 %)
	c. Mixed	8 (53 %)
3	Enhancement	
	a. Homogenous	8 (53 %)
	b. Heterogenous	7 (47 %)
	4	Calcification
a. Present		1 (7 %)
	b. Absent	14 (93 %)
	5	Resectability
a. Resectable		3 (20 %)
	b. Non- Resectable	12 (80 %)

In CT findings as shown in Table 3, in 9 (60 %) cases margin were ill defined & in 6 (40 %) it was well defined. Hypodense cases were 4 (27 %), hyperdense were 3 (20 %) & mixed were 8 (53 %). 8 (53 %) cases showed homogenous enhancement & 7 (47 %) showed heterogenous. Calcification was present in only 1 (7 %) case. In 3 (20 %) cases lesion was resectable.

**Table 4: Resectability**

Sr No.	Resectability On CT	On Histopathology		Total N (%)
		Resectable N (%)	Non-Resectable N (%)	
1	Resectable N (%)	2 (13 %)	1 (7 %)	3 (20 %)
2	Non-Resectable N (%)	0 (0 %)	12 (80 %)	12 (80 %)
3	Total N (%)	2 (13 %)	13 (87 %)	15 (100 %)
Sensitivity: 100 % Specificity: 92.31 % PPV: 66.67 % NPV: 100 %				

In Table 4 resectability detection amongst CT & histopathology is compared. 2 (13 %) were found resectable on both CT & histopathology whereas 12 (80 %) found non-resectable. 1 (7 %) cases was found resectable on CT but later commented as non-resectable on histopathology (Graph 1)



**Graph 1: Resectability**

**DISCUSSION**

Conventional imaging techniques has low sensitivity in detecting biliary and pancreatic abnormalities. Many ampullary and periampullary abnormalities are first detected on CT and MRI as an incidental finding during investigation for other clinical problems. Imaging in pancreas abnormality is challenging because of its anatomic location in the retroperitoneum. Also, its intricate relationship with major blood vessels and bowel is a hurdle for imaging. Computed tomography (CT) has been first choice imaging modality in case of pancreatic pathology, Present study was undertaken in 15 Patients between age group 30 to 75 years with clinical and laboratory findings of pancreatic mass or those came for follow-up & referred to the CT Unit of our hospital. CT scan was performed using a 128 slice CT machine (Toshiba) in all cases. Results compiled & analysed. In present study 30 to 45 years age group was dominant in-patient prevalence with 7 (47 %) cases followed by 46 to 60 years age group with 5 (33 %) cases. In similar study by Dorine S. J. Tseng et al (2021) 11 median age was 66 with range 39 to 86 years. Males were 105 (53 %).

Mahmoud Abdelaziz Dawoud et al (2014) 12 included 20 patients (16 males and 4 females), with the commonest age between 50 and 60 years. John et al (2005) 13 found that 60 to 80 years are the most affected group with pancreatic neoplasms. In present study Adenocarcinoma was detected in 6 (40 %) cases, Ampullary carcinoma in 3 (20 %), IPMN in 1 (7 %), Other Pre-malignancy conditions in 1 (7 %). In 4 (26 %) cases however no histologic specimen obtained. In 9 (60 %) cases margin were ill defined & in 6 (40 %) it was well defined. Hypodense cases were 4 (27 %), hyperdense were 3 (20 %) & mixed were 8 (53 %). 8 (53 %) cases showed homogenous enhancement & 7 (47 %) showed heterogenous. Calcification was present in only 1 (7 %) case. In 3 (20 %) cases lesion was

resectable. 2 (13 %) were found resectable on both CT & histopathology whereas 12 (80 %) found non- resectable. 1 (7 %) case was found resectable on CT but later commented as non- resectable on histopathology. In similar study by Dorine S.J.Tseng et al (2021)<sup>11</sup> irregular margins found in 13. Median size at CT remained at 5 mm ± 3.9 (range, 0–21 mm) and 6 mm ± 3.7 (range, 3–21 mm). Mahmoud Abdelaziz Dawoud et al (2014)<sup>12</sup> found well defined margins are detected in twelve cases, while the remaining eight cases had ill-defined margins. Seven cases had hypodense, and two cases appeared hyperdense. Eleven patients showed homogenous enhancement, nine patients showed heterogeneous enhancement. Only one case showed calcification. CT could detect the pancreatic masses in 20 patients resulting in sensitivity of 97.7 %. Scaglione et al (2005)<sup>14</sup> reported sensitivity as 90 to 97% in the detection of pancreatic masses

**CONCLUSION**

In conclusion, CT have a fair diagnostic accuracy in the assessment of pancreatic tumours resectability with sensitivity (100 %), specificity (92.31 %), PPV (66.67 %) and NPV (100 %). As in daily practice decisions are made on PPV and NPV, fair PPV & 100 % NPV in this study can be helpful in diagnosis and predicting pancreatic masses and resectability.