

## Original Research Article

# STUDY THE ROLE OF MDCT IN EVALUATION OF PANCREATIC LESION

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## ABSTRACT

**Background:** Multislice CT is the most efficient non invasive technique in the assessment of pancreatic cancer, multislice CT allows excellent visualization of the pancreatic cancer during the different stages of contrast enhancement, thereby facilitates detection of small pancreatic lesions and evaluation of peripancreatic structures. 3D multiplanar reformatted images can be used to solve different diagnostic problems and to help communicate findings to clinicians. The aim & objective is 1. Study the role of MDCT in evaluation of pancreatic lesion. 2. To study the differentiate between benign and malignant pancreatic lesions. 3. Correlate the MDCT findings with available surgical, cytological, histopathological findings and Sensitivity and Specificity of MDCT

**Materials and Methods:** Study design: Prospective observational study. Study Place: Department of Radiodiagnosis, R.K.Damani Medical College, Chhatrapati Sambhajnagar, Maharashtra. Study duration: 1 year (from May 2024 to May 2025). Study population: The study population included all suspected cases of pancreatic lesions admitted at a Department of Radiodiagnosis, R.K.Damani Medical College, Chhatrapati Sambhajnagar, Maharashtra. Sample size: 50.

**Results:** Majority of study cases belongs to the age group 21-30 years e.g 11 (22%) followed by 31-40 years age group 09 (18%), 8,7,7,5 and 3 cases in age group 11-20, >60,41-50, 51-60 and <10 years age group respectively. Males contributing 32 (64%) and females 18 (36%). most common pancreatic malignant lesions was pancreatic adenocarcinoma 20, most common benign lesion was pseudocyst 13 cases followed by Mucinous cystadenoma 7, serous cystadenoma 5, Simple cystic lesion 3 and focal pancreatitis found in 2 cases. Sensitivity 92.50%, Specificity 80%.

**Conclusion:** Majority of study cases belongs to the age group 21-30 years. Most of cases were Males, most common pancreatic malignant lesions were pancreatic adenocarcinoma and most common benign lesion was pseudocyst. Sensitivity and Specificity of MDCT shows Sensitivity=92.50%, Specificity=80%.

**Keywords:** MDCT, Pancreatic benign and malignant lesions, pancreatic adenocarcinoma.

## INTRODUCTION

Imaging of the pancreas is challenging because of its anatomic location in the retroperitoneum and its intricate relationship with major blood vessels and bowel. Computed tomography (CT) has been the initial imaging modality of choice for evaluation of pancreatic pathology.<sup>[1]</sup> Pancreatic cancer is the fourth most frequent cause of cancer-related death.

The incidence is increasing and the overall survival has been altered a little in recent years.<sup>[2]</sup>

The overall 5 years survival rate of pancreatic cancer ranges from 0.4% to 4%, the lowest for any cancer. Currently surgical resection offers the best chance of cure, however more than 80% of patients present with advanced and unresectable disease. The key to increase resection rates of pancreatic cancer lies with early diagnosis.<sup>[3]</sup>

Recent improvements in imaging techniques have made it possible to improve the diagnostic accuracy for detection, staging, and indicating surgical resectability of pancreatic cancer.<sup>[4]</sup> Improvements in CT technology during the past decade, with fast image acquisition and improved spatial resolution, have increased the accuracy of CT for lesion detection and characterization. Axial CT images are not sufficient to demonstrate the complex anatomy of the pancreas and have made it mandatory to have multiphasic and multiplanar imaging of the pancreas.<sup>[5]</sup>

Multislice CT is the most efficient non invasive technique in the assessment of pancreatic cancer, multislice CT allows excellent visualization of the pancreatic cancer during the different stages of contrast enhancement, thereby facilitates detection of small pancreatic lesions and evaluation of peripancreatic structures. 3D multiplanar reformatted images can be used to solve different diagnostic problems and to help communicate findings to clinicians.<sup>[6]</sup>

The MDCT has improved volume coverage speed and spatial resolution along z-axis, and allows three-dimensional reformatting due to isotropic voxels and exquisite multiplanar reconstruction of pancreatic anatomy. High speed of MDCT also allows organ imaging in clearly defined perfusion phase.<sup>[7]</sup>

MDCT permits the acquisition in the arterial phase, pancreatic (parenchymal) phase and portal venous (hepatic) phase with a delay of 20, 40 and 70 sec, respectively, using 120 ml of iodinated contrast medium injected intravenously at a rate of 3 ml/sec. Maximum enhancement of pancreas and the maximum tumor-to-parenchymal attenuation difference is achieved during pancreatic phase followed by portal venous phase and the arterial phase.

Therefore, for tumor detection, particularly adenocarcinoma, pancreatic and portal venous phases are superior to those obtained in the arterial phase. However, for detection of vascular invasion and liver metastases, the sensitivity of images obtained in the portal venous phase is better than those obtained in the pancreatic and arterial phases. Images of the pancreas obtained in the arterial phase are helpful in good visualization of the peripancreatic arterial supply. Using this image acquisition, it is possible to diagnose and characterize a small pancreatic lesion (less than 2 cm in diameter) more accurately, establish the level of peripancreatic vascular invasion and detect liver metastasis.

#### **Aim and Objectives**

1. Study the role of MDCT in evaluation of pancreatic lesion.
2. To study the differentiate between benign and malignant pancreatic lesions.
3. Correlate the MDCT findings with available surgical, cytological, histopathological findings and Sensitivity and Specificity of MDCT

## **MATERIALS AND METHODS**

**Study design:** Prospective observational study.

**Study Place:** Department of Radiodiagnosis, R.K.Damani Medical College. Chhtrapati Sambhajanagar, Maharashtra.

**Study duration:** 1 year (from May 2024 to May 2025).

**Study population:** The study population included all suspected cases of pancreatic lesions admitted at a Department of Radiodiagnosis, R.K.Damani Medical College. Chhtrapati Sambhajanagar, Maharashtra.

**Sample size:** 50

#### **Inclusion criteria:**

1. Patients with clinical findings/biochemical markers/ultrasound findings that are suggestive of pancreatic lesions .
2. Patients with chronic abdominal pain.
3. Patients with incidentally detected pancreatic lesions.
4. Patients who are capable of understanding the study constraints and confirm with the guidelines of informed consent.

#### **Exclusion criteria:**

1. Pregnant patients or those with contraindications to MDCT
2. Patients with H/O allergy
3. Patients with deranged RFT
4. Not willing to participate in study

#### **Approval for the study:**

Written approval from Institutional Ethics committee was obtained beforehand. Written approval of Radiodiansis department and related department was obtained. After obtaining informed verbal consent from all patients with pancreatic lesions admitted in tertiary care centre such cases were included in the study.

**Sample Size:** With reference to study by Binit sureka et al.<sup>[17]</sup> He found that the Sensitivity of MDCT scan for the detection of pancreatic malignancy was 90%

Formula for sample size =  $4 * P * Q / L^2$

Where P = 90%, Q = 100 -90 = 10, L = Allowable error = 10% (Absolute error),

Sample size =  $4 * 90 * 10 / 81 = 44.44$ , Sample size Rounded to = 50

**Sampling technique:** Convenient sampling technique used for data collection

#### **Methods of Data Collection and Questionnaire:**

Predesigned and pretested questionnaire was used to record the necessary information. Questionnaires included general information, such as age, sex, residential address, and date of admission. Medical history- chief complain, past history,

Data on demographic profile of patient, investigation, and personal history, medical past history. The study was approved by institutional ethical committee. It was a prospective observational study consisting of 50 patients who presented with pancreatic lesions. It was conducted at a Department of Radiodiagnosis, R.K.Damani Medical College, Chhtrapati Sambhajanagar, Maharashtra. The patients having

history suggestive of pancreatic lesions. All these patients were studied by spiral multislice multidetector Computed tomography (FUJIFILM, MDCT-64 Slice Machine).

#### Study Procedure:

This study was conducted on All patients with pancreatic lesions admitted at Department of Radiodiagnosis, R.K.Damani Medical College, Chhtrapati Sambhajinagar, Maharashtra. Patients with clinical /biochemical markers /USG findings suggestive of pancreatic lesions and patients with chronic abdominal pain was undergo MDCT Evaluation by FUJIFILM, MDCT-64 Slice Machine Lesions characterized as benign and malignant Lesions and findings was documented. Patients evaluated with endoscopic ultrasound (if available) Patients undergoing surgery. Patients undergoing FNAC /biopsy Findings was documented and compared with MDCT findings

**Data entry and analysis:** The data were entered in Microsoft Excel and data analysis was done by using SPSS demo version no 21 for windows. The analysis was performed by using percentages in frequency tables, classify benign and malignant pancreatic lesions and sensitivity, specificity of MDCT, Correlation of pancreatic lesions with various variable  $p < 0.05$  was considered as level of significance using the Chi-square test

## RESULTS

The present prospective observational study was done among 50 cases of pancreatic lesions referred to Radiodiagnosis department of R.K. Damani Medical College, Chhtrapati Sambhajinagar.

**Table 1: Distribution of cases according to age (N=50).**

Age in years	Frequency	Percentage
<10	03	6%
11-20	08	17%
21-30	11	22%
31- 40	09	18%
41-50	07	14%
51-60	05	10%
>60	07	14%
Total	50	50 (100%)

Above table shows that majority of study cases belongs to the age group 21-30 years e.g 11 (22%) followed by 31-40 years age group 09 (18%), 8,7,7,5

and 3 cases in age group 11-20, >60, 41-50, 51-60 and <10 years age group respectively.

**Table 2: Age wise distribution of benign pancreatic lesions (N=50).**

Age in years	Frequency	Percentage
<10	02	6.66%
11-20	04	13.33%
21-30	07	23.33%
31- 40	06	20%
41-50	05	16.66%
51-60	03	10%
>60	04	13.33%
Total	30	30 (100%)

The above table shows majority of pancreatic benign lesion found in the age group of 21-30 years e.g 07 (23.33%) followed by 31-40 age group 6 cases (20%)

5 cases in 41-50 age group, 4 in >60 years age group 4, 3, 2 cases in 11-20, 51-60 and <10 years age group respectively.

**Table 3: Age wise distribution of Malignant pancreatic lesions (N=50)**

Age in years	Frequency	Percentage
<10	00	00%
11-20	01	5%
21-30	01	5%
31- 40	02	15%
41-50	04	20%
51-60	05	20%
>60	07	35%
Total	20	20(100%)

The above table shows majority of cases found in the age group of above 60 years 7 cases (35%) followed by 5 cases in 51-60 years group, 4 in 41-50, 2 cases in

31-40 group and 1 case in 21-30 and 11-20 years age group.

**Table 4: Distribution of pancreatic lesions according to MDCT (N=50)**

Pancreatic lesions (n=50)	MDCT diagnosis	percentage
Pancreatic Adenocarcinoma	20	40%
Pseudocyst	13	26%
Mucinous cystadenoma	7	14%
Serous Cystadenoma	5	10%
Simple cystic lesion	3	6%
Focal pancreatitis	2	4%
Total	50	50 (100%)

The above table shows most common pancreatic malignant lesions was pancreatic adenocarcinoma 20, most common benign lesion was pseudocyst 13

cases followed by Mucinous cystadenoma 7, serous cystadenoma 5, Simple cystic lesion 3 and focal pancreatitis found in 2 cases.

**Table 5: Distribution of cases according to location (N=50)**

Pancreatic location	Frequency	Percentage
Head	17	34%
Uncinate process	3	6%
Body	6	12%
Tail	2	4%
Head and uncinate process	4	8%
Head and neck	5	10%
Head and body	4	8%
Neck and body	6	12%
Body and tail	3	6%
Total	50	50 (100%)

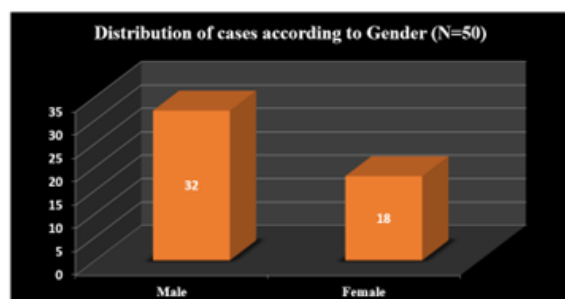
The above table shows majority of cases pancreatic lesions location was Head e.g 17 followed by body 6,

neck and body 6, head and neck 5, head and body 4, body and tail 3 and uncinate process 3.

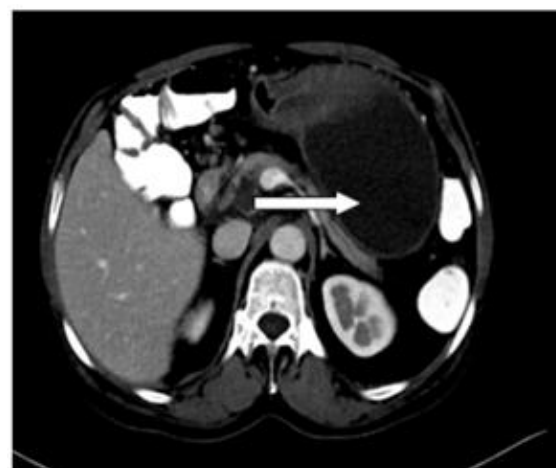
**Table 6: Sensitivity and Specificity of MDCT**

MDCT Diagnosis	Pathological Diagnosis		Total
	Disease	Not Disease	
Positive	37	2	39
Negative	3	8	11
Total	40	10	50

Sensitivity=92.50%, Specificity= 80%, Positive Predictive value = 94.87%, Negative Predictive value = 72.72%

**Figure no: 1 Distribution of cases according to Gender (N=50)**

Above figure shows that majority of study cases were Males contributing 32 (64%) and females 18 (36%)

**Image no 1: Pancreatic adenocarcinoma****Image 2: Pseudo cyst of pancreas**

## DISCUSSION

The present prospective observational study was done among 50 cases of pancreatic lesions referred to Radiodiagnosis department of R.K. Damani Medical College, Chhtrapati Sambhajinagar

Distribution of cases according to age (N=50) majority of study cases belongs to the age group 21-30 years e.g 11 (22%) followed by 31-40 years age group 09 (18%), 8,7,7,5 and 3 cases in age group 11-20, >60, 41-50, 51-60 and <10 years age group



respectively. Similar result found in the study by Mahmoud Abdelaziz Dawoud et al,<sup>[8]</sup> (2014) He observed that the majority of cases found in the age ranged from 30-70 years with a mean age of 58 years. Another study by Hossain MS et al,<sup>[9]</sup> (2016) He observed that the commonest age group among the patients was 56-65 yrs (53.2 %) followed by 66-75 yrs age group (25.5%) patients. Jemal A et al,<sup>[9]</sup> (2010) He found that the age 60-80 years are the most affected group with pancreatic neoplasm and uncommon in those younger than 40 years.

Distribution of cases according to Gender (N=50) majority of study cases were Males contributing 32 (64%) and females 18 (36%). Similar result observed in the study conducted by Jemal A et al,<sup>[10]</sup> (2010) He found that the pancreatic lesions were more common in males 78.7% than in females 21.3%. Another study conducted by Hossain MS et al. (2016)<sup>9</sup> He observed that the pancreatic lesions were more common in males (78.7%) than females (21.3%). Similar result found in the study by Mahmoud Abdelaziz Dawoud et al. (2014)<sup>8</sup> He observed that the 20 patients with pancreatic masses, 16 were males and 4 were females. Contrast result found in the study by Koelblinger et al,<sup>[11]</sup> (2011) He reported that the 48 were women and 41 were men.

Distribution of cases according to location (N=50) majority of cases pancreatic lesions location was Head e.g 17 followed by body 6, neck and body 6, head and neck 5, head and body 4, body and tail 3 and uncinate process 3. Similar result found in the study by Becher V et al,<sup>[12]</sup> (1993) He revealed that the 60% of pancreatic tumors were found in the head of pancreas, 10% in the body of pancreas, about 5% in the tail and the remaining 25% were diffusely involved. Scaglione et al,<sup>[13]</sup> (2007) He reported that the pancreatic lesions mainly located in the pancreatic head region. The average size of those lesions located in the head region was 2-3cm.

Distribution of pancreatic lesions according to MDCT (N=50) most common pancreatic malignant lesions was pancreatic adenocarcinoma 20, most common benign lesion was pseudocyst 13 cases followed by Mucinous cystadenoma 7, serous cystadenoma 5, Simple cystic lesion 3 and focal pancreatitis found in 2 cases. Similar result reported by Nisha sainani et al,<sup>[14]</sup> (2007) He found that the Pathologically 54 lesions were benign, 29 lesions were malignant. 58 lesions were mucinous whereas 21 were nonmucinous. Among the non-mucinous lesions, 12 were benign cysts, 4 were serous cystic neoplasms and 1 lesion was solid pseudopapillary neoplasm.

Sensitivity and Specificity of MDCT (N=50) shows Sensitivity=92.50%, Specificity= 80%, Positive Predictive value = 94.87% Negative Predictive value = 72.72%. similar finding observed in the study by Hossain MS et al,<sup>[9]</sup> (2016) He found that the sensitivity of about 87.5% in evaluation of pancreatic mass lesions, specificity was 66.6%, Positive predictive value was 84.8%, Negative predictive value was 71.4% and diagnostic accuracy was 80.8%.

Scaglione et al,<sup>[13]</sup> (2007) He reported that the sensitivity of MDCT as high as 90 to 97% in the detection of pancreatic malignant masses.

Mahmoud Abdelaziz Dawoud et al,<sup>[8]</sup> (2014) He observed that the multislice CT had a sensitivity of 97.7 % in detecting pancreatic lesions. Eun sun lee et al,<sup>[15]</sup> (2014) He found that the MDCT showed the sensitivity, specificity and positive predictive value were 100%, 72% and 89 % respectively. For detecting and staging adenocarcinoma, sensitivity of MDCT was 90%. Koelblinger et al,<sup>[11]</sup> (2011) He reported that the 64 detector row CT had a sensitivity of 98%, specificity of 96% for detection of pancreatic cancer. Vascular invasion was seen in 22 patients yielding a sensitivity of 90 % and specificity of 98%. Rosch T et al,<sup>[16]</sup> (1991) He reported that the sensitivity and specificity of CT was 77 % and 53% respectively. Endoscopic ultrasound has a sensitivity and specificity of 99% and 100%. But this was for small pancreatic tumors measuring 3cm or less. Endoscopic ultrasound was not able to reliably differentiate malignant from inflammatory pancreatic masses. Low sensitivity reported by Binit sureka et al,<sup>[17]</sup> (2016) He found that the MDCT had a sensitivity of 56 -85% for characterization of cystic pancreatic lesions.

## CONCLUSION

Majority of study cases belongs to the age group 21-30 years, Most of study cases were Males contributing. Majority of pancreatic benign lesion found in the age group of 21-30 years. Most of cases pancreatic lesions location was Head. Sensitivity and Specificity of MDCT was Sensitivity=92.50%, Specificity= 80%, Positive Predictive value = 94.87% Negative Predictive value = 72.72%.

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