Role of MDCT in evaluation of pancreatic lesion

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Abstract

Background: 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 [1]. 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 [2].

Aim & Objective:

1. Document the effectiveness of MDCT in evaluating and characterizing various types of pancreatic lesions.

2. To differentiate between benign and malignant pancreatic lesions.

Methods: Prospective observational study. Study setting: Department of Radiodiagnosis at tertiary care Centre.

Study population: The study population included all suspected cases of pancreatic lesions admitted at a tertiary care center and referred to Radiodiagnosis department. 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. majority of study cases were Males contributing 32 (64%) and females 18 (36%). 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. most common pancreatic lesions was pancreatic Pseudo cyst 20 most common benign lesion,13 cases of pancreatic adenocarcinoma, Mucinous cystadenoma 7, serous cystadenoma 5, Simple cystic lesion 3 and focal pancreatitis found in 2 cases. majority of cases pancreatic lesion's location was Head e.g., 17 followed by body 6, neck and body 6, head nad neck 5, head and body 4, body and tail 3 and uncinate process 3. Sensitivity and Specificity of MDCT (N=50) shows Sensitivity=92.50%, Specificity= 80%, Positive Predictive value = 94.87% Negative Predictive value = 72.72%.

Conclusions: Pancreatic lesions according to MDCT (N=50) most common pancreatic malignant lesions was pancreatic adenocarcinoma and most common benign lesion was pseudocyst.

Keywords: MDCT, pancreatic adenocarcinoma, pseudo cyst, TNM staging.

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 [1]. 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 [2].

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 [3].

Recent improvements in imaging techniques have made it possible to improve the diagnostic accuracy for detection, staging, and indicating surgical resect ability of pancreatic cancer [4]. 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 [5].

Multislice CT is the most efficient noninvasive 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 [6].

Aim and objectives

Objectives

Primary

1. Document the effectiveness of MDCT in evaluating and characterizing

various types of pancreatic lesions.

2. To differentiate between benign and malignant pancreatic lesions.

Secondary

1. Correlate the MDCT findings with available surgical, cytological, his topathological findings & also follow up

Material and methods

Study design

Prospective observational study

Study setting

Department of Radiodiagnosis at tertiary care Centre

Study duration: June 2021 till may 2022

Study population

The study population included all suspected cases of pancreatic lesions admitted at a tertiary care center and referred to Radiodiagnosis department

Inclusion criteria

1. Patients with clinical findings/biochemical markers/ultrasound findings that is 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 Radiodianosis 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 M Arabul et al (2012)[7] He found that the Sensitivity of MDCT scan for the detection of pancreatic malignancy was 90%

Formula for sample size = 4* P* Q / L2

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

All patients admitted Radio gnosis department of tertiary care center from June 2021 to May 2022 with pancreatic lesions were included in the study.

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 neck patient, investigation, and personal history, medical past history. The study was approved by institutional ethical committee.

It was a prospective observational studyconsisting of 50 patients who presented with pancreatic lesions. It was conducted at a tertiary care medical hospital in an urban area. The patients having history suggestive of pancreatic lesions. All these patients were studied by spiral Multislice multi detector Computed tomography (Siemen's Somatodom Volume Zoom machine).

Study procedure

This study was conducted in Radiology Department of tertiary care center, in patients who satisfied the above said inclusion and exclusion criteria and this study conducted from June 2021 to May 2022. Patients with clinical /biochemical markers /USG findings suggestive of pancreatic lesions and patients with chronic abdominal pain was undergo MDCT Evaluation by 128 slices Siemens Somatom CT Scan 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 and observations

The present prospective observational study was done among 50 cases of pancreatic lesions referred to Radiodiagnosis department of tertiary care Centre during study period.

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.
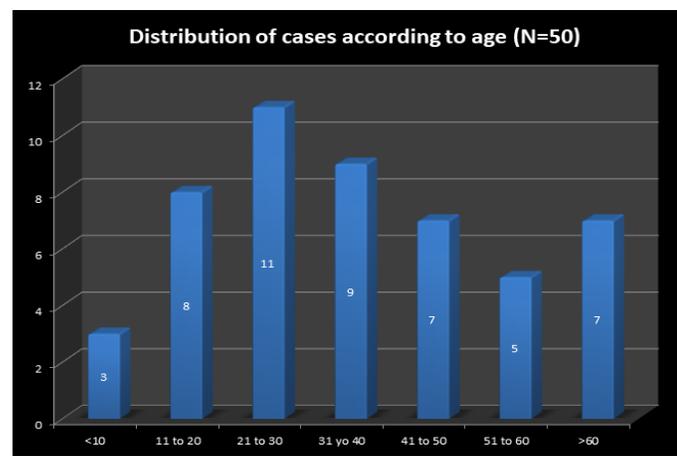

Figure 1: Distribution of cases according to age (N=50)

Above Figure 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: Distribution of cases according to Gender (N=50)

Gender	Frequency	Percentage
Male	32	64%
Female	18	36%
Total	50	50 (100%)

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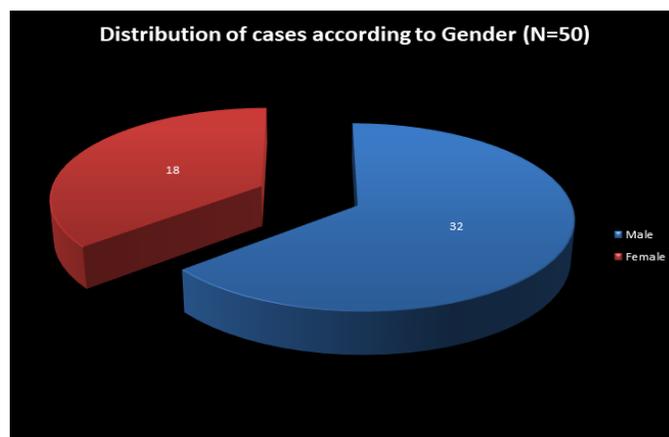

Figure 2: Distribution of cases according to Gender (N=50)

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

Table 3: Distribution of pancreatic lesions according to MDCT (N=50)

Pancreatic lesions (n=50)	MDCT diagnosis	Percentage
Pancreatic adenocarcinoma	13	26%
Pseudocyst	20	40%
Mucinous Cystdenoma	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 lesions was pancreatic Psedocyst 20 most common benign lesion,13 cases of pancreatic adenocarcinoma, Mucinous cystadenoma 7, serous cystadenoma 5, Simple cystic lesion 3 and focal pancreatitis found in 2 cases.
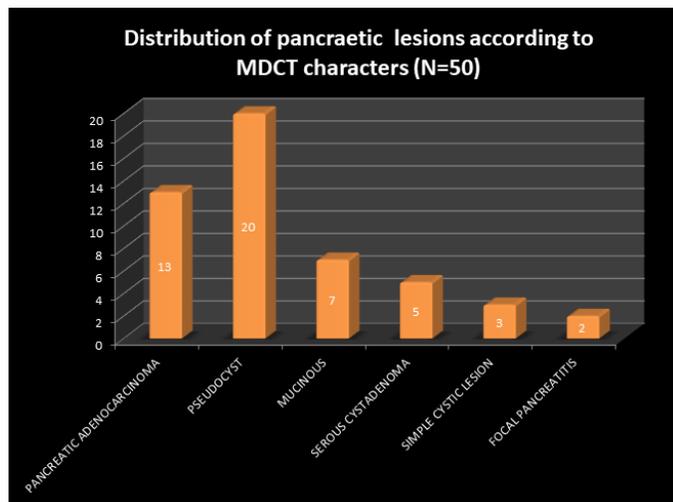

Figure 3: Distribution of benign pancreatic lesions according to MDCT (N=50)

The above figure shows most common pancreatic lesions was pancreatic Psedocyst 20 most common benign lesion,13 cases of pancreatic adenocarcinoma, Mucinous cystadenoma 7, serous cystadenoma 5, Simple cystic lesion 3 and focal pancreatitis found in 2 cases.

Table 4: 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= a/(a+c) ×100 =87/90×100= 92.50%
- Sensitivity=92.50%
- Specificity= d/(b+d) ×100=8/10×100=80%
- Specificity= 80%
- Positive Predictive value = a/(a+b) ×100= 87/89×100=94.87%
- Positive Predictive value = 94.87%
- Negative Predictive value = d/(c+d) = 8/11×100= 72.72%
- Negative Predictive value = 72.72%

Discussion

The present prospective observational study was done among 50 cases of pancreatic lesions referred to Radiodiagnosis department of tertiary care Centre during study period.

Table1Distribution 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 (2014)[8] 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 (2016)[9] 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 (2010)[10] He found that the age 60-80 years are the most affected group with pancreatic neoplasm and uncommon in those younger than 40 years

Table No. 2: 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 (2010)[10] 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)[9] 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)[8] 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 (2011)[11] He reported that the 48 were women and 41

Were men.

Table 3Distribution 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 (2007)[12] 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.

Table 4 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 (2016)[9] 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%. Scaglion et al (2007)[13] 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 (2014)[8] He observed that the multislice CT had a sensitivity of 97.7 % in detecting pancreatic lesions. Eun sun lee at all (2014)[14] 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 (2011)[11] 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 (1991)[15] He reported that the sensitivity and specificity of CT was 77 % and 53% respectively.

Conclusions

➢ Majority of study cases belongs to the age group 21-30 years.

➢ Majority of study cases were Males contributing.

➢ Pancreatic lesions according to MDCT (N=50) most common pancreatic malignant lesions was pancreatic adenocarcinoma and most common benign lesion was pseudocyst.

➢ Sensitivity and Specificity of MDCT (N=50) shows Sensitivity=92.50%, Specificity= 80%, Positive Predictive value = 94.87% Negative Predictive value = 72.72%.

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