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Original Research Paper

Radio-Diagnosis

EVALUATING THE DIAGNOSTIC ACCURACY OF MDCT FOR AMPULLARY AND PERIAMPULLARY TUMORS: A STUDY LINKING HISTOPATHOLOGICAL FINDINGS.

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ABSTRACT

Purpose: Ampullary and periampullary tumors pose challenges in gastrointestinal oncology due to their complex anatomy and malignancy potential. These neoplasms arise in the ampulla of Vater region and surrounding structures, including distal common bile duct, pancreatic head, and duodenum. Early diagnosis is crucial for optimal patient outcomes. **Aim:** To evaluate MDCT diagnostic efficacy in ampullary and periampullary tumors by correlating imaging with histopathological results. **Materials And Methods:** This prospective observational study was conducted on patients at Department of Radio diagnosis, Konaseema Institute of Medical Sciences, Amalapuram for CT with clinical suspicion of periampullary tumors. The lesions were correlated with HPE reports. **Results:** This comparative analytical study included 60 patients. A significant positive correlation existed between benign and malignant tumors distribution with p value < 0.0001. **Conclusion:** In periampullary tumors, strong correlation exists between HPE diagnosis and CT results. MDCT is a promising imaging technique for periampullary tumor assessment.

KEYWORDS :

INTRODUCTION:

Ampullary and periampullary tumors pose a significant challenge in gastrointestinal oncology due to their complex anatomical location. These neoplasms arise in the ampulla of Vater region and surrounding structures, including the distal common bile duct, pancreatic head, and duodenum[1].

Early diagnosis is crucial for optimal patient management and outcomes. Multi-detector computed tomography (MDCT) has emerged as a valuable imaging modality for evaluating these tumors. Its high-resolution, multi-planar images have revolutionized their diagnostic approach. MDCT provides detailed visualization of tumor extent, invasion, and metastatic spread, which are essential for determining resectability and treatment planning. Despite imaging advancement, MDCT's precise diagnostic efficacy remains under research[2,3].

The correlation between MDCT findings and histopathological results impacts preoperative staging accuracy and clinical decision-making.

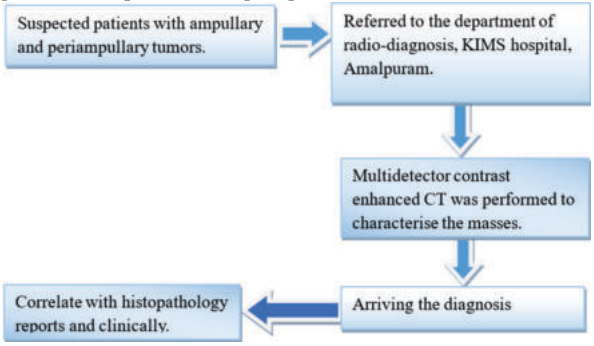
This study aims to evaluate MDCT's diagnostic efficacy in ampullary and periampullary tumors by correlating imaging with histopathological results. By assessing MDCT's accuracy, sensitivity, and specificity, we seek to refine diagnostic protocols and improve patient care.

MATERIALS AND METHODS

Study Design: Prospective observational study

Data Collection:

The study will be a prospective study conducted on a minimum of 60 patients over a period of 18 months at the Department of Radiodiagnosis, KIMS hospital ,Amalapuram . After obtaining relevant clinical history and consent from the patient,& they underwent preoperative CT assessment.



Selection Criteria:

Inclusion Criteria:

After obtaining informed agreement, patients undergoing abdominal CT scans with a clinical suspicion of periampullary pathology who also had a biopsy from the periampullary lesion were added to the study.

Exclusion Criteria:

Patients with acute kidney injury or end-stage renal failure, pregnant women, and those with contrast allergies.

Imaging Protocol :

Patients were selected based on inclusion criteria. CT images were obtained with a 64-slice MDCT scanner (GE). Plain CT was performed initially. After a test dose, 80-100 mL of IOHEXOL contrast was given. Patients underwent pancreatic phase protocol with contrast enhancement in single breath hold. Images were transferred to a 3D workstation for reconstruction. The size, location, extent, contrast attenuation values, mass effect and invasion into adjacent structures were evaluated.

Imaging Findings:
Intrahepatic biliary radicles, bile duct and pancreatic duct status was analyzed. Periampullary lesions cause duct dilatation based on location [double duct sign], with minimal dilatation in benign conditions. Adjacent organ involvement showed indistinct fat planes with tumors. Vessel infiltration was determined by ill-defined fat planes, vessel encasement causing narrowing or thrombosis. Pancreatic head cancer displayed lower HU value than normal parenchyma, with arterial and venous phase enhancement. Necrotic areas showed minimal improvement. In cholangiocarcinoma, wall thickening showed delayed enhancement. Ampullary cancer showed enhancement greater than pancreatic cancer but less than cholangiocarcinoma. Benign lesions showed minimal enhancement. Biopsy was correlated with CT finding.

Statistical Analysis:
SPSS (Statistical Package For Social Sciences) version 20. (IBM SPASS statistics [IBM corp. released 2011] was used to perform the statistical analysis Data was entered in the excel spread sheet.

Descriptive statistics of the explanatory and outcome variables were calculated by frequencies and percentages for qualitative variables.

Inferential statistics like Chi-square test was applied for qualitative variables. The level of significance is set at 5%

RESULTS:
Among the 60 participants, the largest group, accounting for 25.0%, was aged between 51 and 60 years. This was followed by 23.3% of participants in the 41-50 years age bracket, and 12 individuals (20.0%) were under 40 years old. The ages of the subjects spanned from 35 to 82 years, with the average age being 55 years.

In the research, 66.6% of the participants were female, while 33.3% were male.

Out of 60 cases, 73.3% were malignant and 26.6% were benign.

Table 1: Distribution Of Malignant Tumors Based On HPE Diagnosis

HPE Diagnosis	Number of cases	Percentage
Ampullary carcinoma	22	36.6%
Pancreatic head carcinoma	8	13.3%
Adeno carcinoma of duodenum	5	8.3%
Cholangio carcinoma	5	8.3%
Mass forming pancreatitis	2	3.3%
	42	69.8%

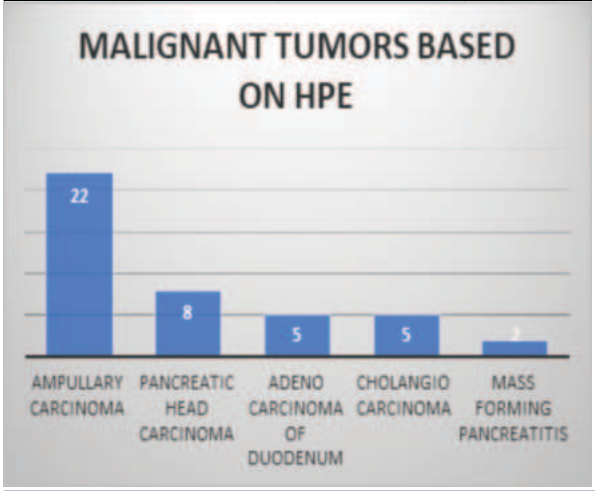
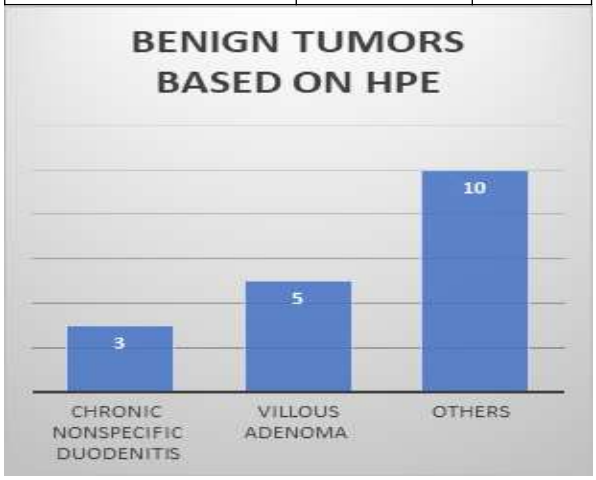


Table 2: Distribution Of Benign Tumors Based On HPE Diagnosis

HPE diagnosis	Number of cases	Percentage
Chronic nonspecific duodenitis	3	5.0%
Villous adenoma	5	8.3%
Others	10	16.6%
TOTAL	18	29.9%



In the HPE study, 63.6% of cases were identified as having ampullary carcinoma, adenocarcinoma, cholangiocarcinoma, or mass-forming pancreatitis. Additionally, 4.5% were diagnosed with chronic non-specific duodenitis, and 7.5% had villous adenoma. Overall, 63.6% of the lesions were malignant, while 12.0% were benign.

Table 7: Association Between Tumors And HPE:

		Malignant		Benign		Total
		Count	Percentage	Count	Percentage	
CT diagnosis	Malignant	38	90.4%	6	33.3%	44
	Benign	4	9.5%	12	66.6 %	16
Total		42	100	18	100	60

Chi-squared:	20.6883
DF:	1
Significance level:	P < 0.0001

	Value	95% CI
Sensitivity	95.45%	84.53% to 99.44%
Specificity	88.89%	65.29% to 98.62%
Positive Predictive Value	95.45%	85.02% to 98.73%
Negative Predictive Value	88.89%	67.16% to 96.90%
Accuracy	93.55%	84.30% to 98.21%

DISCUSSION:
The present study titled "**Evaluating the diagnostic accuracy of MDCT for ampullary and periampullary tumors: a study linking histopathological findings.**" was conducted at KIMS medical college ,Amalapuram for 18 months. This study is a prospective observational study on 60 patients presented with suspected adnexal masses.

We carried out our research to assess how effective MDCT is in distinguishing between benign and malignant periampullary tumors and to compare the MDCT results with histopathological findings.

Demographic Characteristics:
Our study included subjects aged 35-82 years with mean of 55 years. Of 60 subjects, most were in age group 51-60 years (25.0%), followed by 41-50 years (23.3%), and 7(8.5%) were >70 years. Zhao et al9 showed mean age of 65.6 years, while Anderson et al showed 67 years. Our findings aligned with Anderson et al.'s [6] male preponderance, though Zhao et al. showed no sex preponderance, and Sugita et al. showed female predominance. Lesions were detected in the ampulla,

duodenum, and pancreatic head. This aligned with Zhao et al.[6], showing most damages in pancreatic head after distal CBD. Anderson et al. (2010) found pancreatic carcinoma, ampullary carcinoma, and distal CBD cholangiocarcinoma as major malignancies, while common benign diagnoses were bile duct calculi and chronic pancreatitis. Most patients had dilated intrahepatic biliary radicles, with 86.4% showing CBD dilatation and 65.9% pancreatic duct dilatation. Zhao et al. found double duct signs in 90% of patients. Terminal CBD cholangiocarcinoma patients showed severe IHBR dilatation, while 30.8% showed pancreatic duct dilatation with malignant lesions. Benign tumors showed no overt duct dilation. CT revealed ampullary carcinoma as most common, followed by pancreatic head malignancy. Most biopsies showed adenocarcinoma, followed by chronic pancreatitis and nonspecific duodenitis. Of 42 malignant cases confirmed by histopathology, 38 (93.8%) showed malignancy on CT. Of 18 benign cases, 12 were correctly diagnosed on CT. CT showed 95.45% sensitivity and positive predictive value, while Anderson et al[6] reported 100% sensitivity and 81% positive predictive value.

CONCLUSION:

In periampullary tumors, strong correlation exists between HPE diagnosis and CT results. MDCT is a promising imaging technique for periampullary tumor assessment

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