

Original Articles

Clinical Value of Serum Ca 19.9 Level as a Tumor Marker in Pancreatic Malignancy

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Abstract

Background: Pancreatic cancer carries a poor prognosis; at operation approximately 25% of patients are found to have unresectable tumours even though CT has demonstrated that they are resectable. At our tertiary care centre, we intended to find out if there is an optimum cut-off value for the CA 19-9 level preoperatively that will indicate that the pancreatic cancer is unresectable despite radiologic imaging that suggests otherwise according to receiver operating characteristic (ROC) curve analysis.

Objective: To evaluate the clinical value of serum CA19-9 levels in predicting the resectability of pancreatic carcinoma according to receiver operating characteristic (ROC) curve analysis.

Materials & Methods: This study prospectively analyzed the clinical and imaging data including preoperative CA19-9 level in 25 patients with pancreatic cancer who underwent surgical resection in the department of surgery, DMCH from February 2012 to January 2013. Resectability of pancreatic cancer was evaluated at least by preoperative bolus-contrast, triple-phase helical computer tomography (CT) scan. ROC curve was plotted for the CA19-9 levels. The point closest to the upper left-hand

corner of the graph were chosen as the cut-off point. The sensitivity, specificity values of CA19-9 at this cut-off point were calculated.

Results: Resectable pancreatic cancer was detected in 09 (36%) patients and unresectable pancreatic cancer was detected in 16 (64%) patients. The cut-off point of CA19-9 level was calculated to be 188 U/mL and the sensitivity and specificity of CA19-9 at this cut-off point were 86.67% and 80.00% respectively.

Conclusion: Preoperative serum CA19-9 level is a useful marker for further evaluating the resectability of pancreatic cancer. Thus increased serum levels of CA19-9 (> 188 U/mL) can be regarded as an ancillary parameter for unresectable pancreatic cancer.

Key words: Serum CA 19.9, Tumor marker, Pancreatic malignancy.

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Introduction:

Pancreatic carcinoma accounts for only 2.6% of all newly diagnosed malignancies.¹ It is the ninth most common malignancy and fifth most common cause for cancer related deaths.² Only

10% of patients have localized disease on presentation.³ The prognosis of pancreatic cancer is extremely poor and its early diagnosis is difficult. Surgical resection is the best modality of treatment. However, local vascular

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involvement, nodal and distant metastases are frequently found at the time of diagnosis, thus losing the opportunity of operation.

Surgical resection represents the core of pancreatic cancer treatment but, unfortunately, at the time of diagnosis, only 15–20% of patients are detected with early-stage pancreatic malignancy and are eligible for resection.⁴ Regrettably, up to 20–30% of radiological resectable malignancies show occult metastases at the moment of surgical exploration.⁵ Furthermore, most of the resected patients die due to early local or distant recurrence. In recent years, the International Study Group of Pancreatic Surgery (ISGPS) and the International Association of Pancreatology (IAP) introduced the concept of biological resectability.⁶ Since elevated preoperative serum levels of carbohydrate antigen 19.9 (CA 19.9) have been associated with both the intraoperative detection of occult metastases and worse disease-free survival, even in resectable pancreatic malignancy patients, CA 19.9 has become the main biological parameter to be used to assess biological resectability. CA19-9 was discovered in the serum of patients with colon cancer and pancreatic cancer in 1981.⁷ CA19-9, also known as carbohydrate antigen 19-9 and cancer antigen 19-9 or sialylated Lewis a antigen is the most commonly used and best validated serum tumor marker for pancreatic cancer diagnosis in symptomatic patients and for monitoring therapy in patients with pancreatic malignancy.⁷ Normally CA 19-9 is synthesized by normal human pancreatic and biliary ductal cells and by gastric, colon, endometrial and salivary epithelium. Usually CA 19-9 is present in small amounts in serum, but can be increased in several malignant gastrointestinal disorders too. Takahashi, in 2020, reported how preoperative CA 19.9 levels > 120 U/mL would allow one to define as “biologically” borderline resectable even tumors radiologically classified as resectable.⁷ Therefore, the role of CA 19.9, already known and defined for diagnostic and prognostic purpose, has also acquired a preoperative staging role. In this study, we evaluated the clinical value of serum CA19-9 level in

predicting the resectability of pancreatic carcinoma according to ROC curve analysis.

Objectives of the study

General Objective

Study the preoperative serum level of CA19.9 in evaluating resectability of pancreatic malignancy.

Specific Objective:

- To record preoperative assessment of serum CA19.9
- To correlate preoperative radiological findings & resectability of tumor with preoperative level of serum CA19.9
- To calculate a cut off value for serum CA19.9 level for resection of lesion.

Materials and Method:

The present study is a prospective cross sectional observational study which was conducted resection in the department of surgery, DMCH from February 2012 to January 2013. The study included 25 patients. Purposive sampling technique was used. Patient demographics, risk factors, associated symptoms including weight loss, jaundice and CA 19-9 values were the variables compared between the resectable & unresectable groups of pancreatic malignancy. A Receiver Operating Characteristic (ROC) curve was used in the estimation of cut off values for CA 19- 9 levels. Data was analyzed by SPSS version 24.

Result:

This study was carried out in 25 patients with pancreatic cancer who underwent surgical intervention at the department of surgery, DMCH from February 2012 to January 2013. Out of all patients 64% were male and 36% were female. Male and female ratio was 1.8:1.

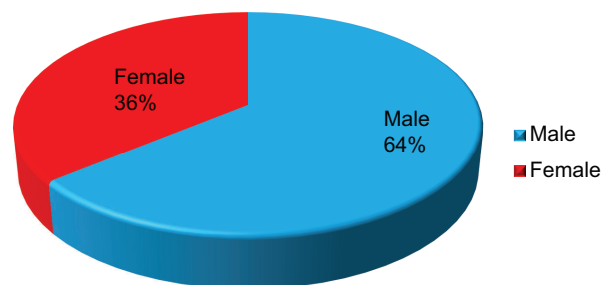


Fig-1: Shows sex distribution of the patients

Most of the patients (44%) belonged to 51 to 60 years age group.(fig-2) Almost all the patients presented with jaundice (88%).

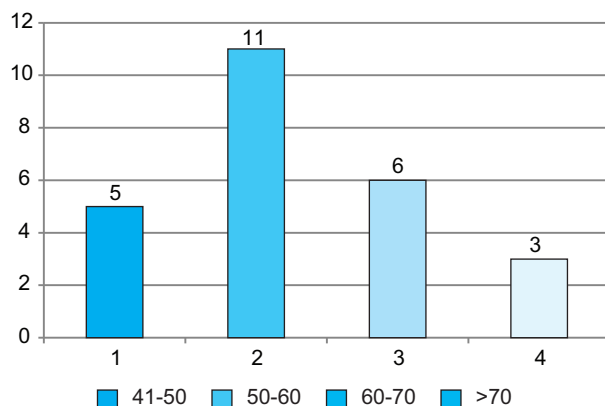


Fig-2: Showing age distribution of patients

Table-I

Shows clinical features of the patients

Symptoms	Frequency	Percent
Jaundice	22	88.0
Weight loss	18	72.0
Nausea	20	80.0
Loss of appetite	16	64.0
Pale stool	18	72.0
Pain	08	32.0
Vomiting	06	24.0

Out of them, 40% of the patient had serum bilirubin level more than 10mg/dl. 24(96%) patients was diagnosed with pancreatic adenocarcinoma confirmed by histopathology. Among them 21(84%) patients had suspected carcinoma in CT scan as well as raised serum CA19-9 level.

Table-II

Shows CT scan, CA 19-9 and histopathological findings of the patients

Investigation	Frequency	Percentage
CT		
• Carcinoma	22	88.0
• OtherSerum Ca-19-9	03	12.0
• Raised	21	84.0
• Normal	04	16.0
Both CT scan and serum Ca 19-9		
• Suspected Carcinoma	21	84.0
• Other Histopathology	04	16.0
• Pancreatic adenocarcinoma	24	96.0
• Others	01	04.0

Peroperatively, 9(36%) patients had resectable cancer. On the other hand 16 (64%) patients had unresectable cancer among the 25 cases. According to the study serum Ca19.9 level found 0.6U/ml is lowest & 3006U/ml is highest. ROC curve revealed a cut off value of 188U/ml for CA 19-9 had sensitivity and specificity of 86.67% and 80.0% respectively which was highest to detect resectability of pancreatic cancer. Thus we concluded increased serum levels of CA19-9 (> 188 U/mL) can be regarded as an ancillary parameter for the unresectability pancreatic cancer.

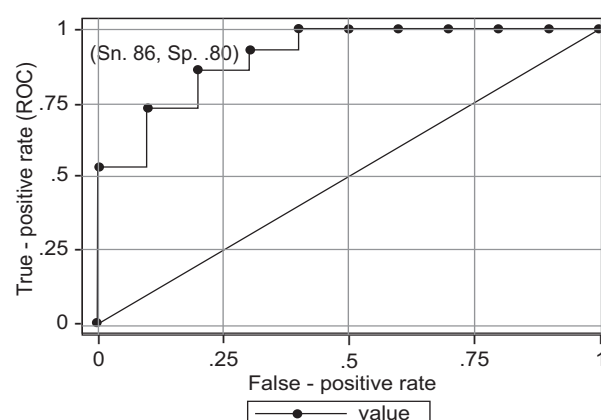


Fig-1: Receiver Operating Characteristic (ROC) Curve of CA 19-9 level showing a value more than 188U/mL level has the highest sensitivity (86.67%) and specificity (80.00%) to detect the resectability of pancreatic malignancy

Discussion:

Pancreatic cancer is one of the leading cause for cancer-related death. The overall five-year survival rate ranges from 0.4% to 4% being the lowest for any cancer.⁸ Prompt diagnosis of pancreatic cancer is difficult because it is asymptomatic in it's early stage. Local invasion and distant metastases are frequently found at the time of diagnosis.

Recently, considerable improvements in radiological imaging make helps to make decision regarding surgery for patients. Contrast enhanced CT Scan is the choice of investigation to detect the resectability of pancreatic cancer. However, approximately 25%-50% of patients with resectable disease on CT Scan are found to have unresectable lesions during surgery.⁹

CA19-9 is a useful tumor marker for the diagnosis of pancreatic adenocarcinoma. Besides its prognostic value is also noteworthy.

Preoperative serum CA19-9 level is an important marker for determining the resectability of pancreatic carcinoma. When the cut-off value of CA19-9 was 188 U/mL according to the point closest to the upper left-hand corner of the graph, the sensitivity, specificity value was 86.67%, 80.00% respectively, indicating that increased serum levels of CA19-9 (> 188 U/mL) can be considered as an auxiliary denominator for the unresectability pancreatic cancer. In our study, pancreatic cancer was resectable only in 2 patients whose preoperative serum CA19-9 level was over 188 U/mL.

According to Kowalchuk et al. the sensitivity, specificity, positive and negative predictive values of CA 19-9 are 82.4%, 92.3%, 91.4% and 83.9%, respectively, in 51 patients, and the cut-off value of CA19-9 was 256.4 U/mL. Though the results are similar to our data, the cut-off value was lower in our study (256.4 U/mL vs 188 U/mL).¹⁰

The present study has some limitations. It was a single centre study. Besides the sample size was very small. So further large scale multi-centre study should be conducted to assess the role of CA 19-9 to predict the resectability of pancreatic malignancy.

Conclusion:

Preoperative serum CA19-9 level is a useful tool for management of pancreatic cancer. Never the less, serum levels of CA19-9 (>188 U/mL) can be used as an important marker to identify unresectable pancreatic cancer.

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