

THE ROLE OF CA 19.9 IN PREDICTING THE OPERABILITY OF CARCINOMA PANCREASJJINRAJ P^{1b}, RENJIN RP*^{1b}

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ABSTRACT

Objectives: Adenocarcinoma of the pancreas remains a relatively incurable disease despite advances in surgical care. Approximately 25% of patients will be found to have unresectable tumors during surgery even though computed tomography (CT) has demonstrated that they are resectable. There is a controversy regarding the use of cancer antigen 19-9 (CA 19-9) to decide the resectability of pancreatic adenocarcinoma [1]. Our aim is to study the use of CA 19-9 in determining the operability of carcinoma pancreas [2].

Methods: This was a prospective study which included 69 patients and the study period was from December 2021 to December 2022. Data were collected from all patients with carcinoma of the pancreas who underwent surgical management. CA 19-9 levels were measured and recorded [3]. During surgery, the operative findings on resectability were documented and tabulated against corresponding CA 19-9 levels and contrast-enhanced CT (CECT) findings.

Results: Of the 69 patients who were operated on, 38 patients had resectable tumors and underwent the Whipples procedure and 31 of them had non-resectable tumors and had to undergo palliative bypass procedures. Among the 31 patients whose tumors were non-resectable, only four were diagnosed non-resectable preoperatively with CECT, and the other 27 were found to be non-resectable only during surgery. That shows the relevance of this study. Of the 31 non-resectable cases, 14 (45.2%) patients had elevated CA 19-9 values of more than 501, and the rest 17 (54.8%) patients had low CA 19-9 values. Among the 38 resectable cases, 12 patients (31.6%) had elevated CA 19-9 more than 501, and 26 patients (68.4%) had low values. In conclusion, among non-resectable cases, 45.2% had raised CA 19-9, and among operable cases, 31.6% showed raised CA 19-9. Hence, CA 19-9 seems to be an insignificant predictor of tumor resectability [4].

Conclusion: It was found that the need for a pre-operative predictor for resectability of carcinoma pancreas is relevant while considering mortality and morbidity in operating carcinoma pancreas cases. On evaluating CA 19-9 as a pre-operative predictor, we found that CA 19-9 has no significant role as an indicator of local advancement or metastasis. Hence, we cannot consider CA 19-9 as a predictor of resectability of carcinoma pancreas preoperatively [5].

Keywords: Carcinoma pancreas, Cancer antigen 19-9, Resectability.

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INTRODUCTION

Adenocarcinoma of the pancreas remains a relatively incurable disease despite advances in the surgical care of resected patients, the move toward enrolling patients in clinical trials, and advances in systemic treatment for other solid tumors of GIT. Cancer antigen 19-9 (CA 19-9) is the most common tumor marker used to diagnose/monitor pancreatic malignancy [6]. It is mainly produced by pancreatic tumor cells and it was first identified in mouse colorectal malignancy. Apart from the pancreas, CA 19-9 is also presented in the hepatobiliary system. Hence, disease of the biliary tract can also cause raised CA 19-9 levels. Its sensitivity and specificity are inadequate for accurate diagnosis, but it can be used to predict the extent of disease and outcome after resection. Pancreatic cancer carries a poor prognosis at operation. Approximately 25% of patients will be found to have unresectable tumors during surgery even though computed tomography (CT) has demonstrated that they are resectable. At our tertiary care center, we wished to find out if there is an optimum cutoff value for CA 19-9 levels preoperatively that will indicate that pancreatic cancer is unresectable despite radiologic imaging. Moreover, there is a controversy regarding the use of CA 19-9 to decide the resectability of pancreatic adenocarcinoma. Hence, the present study is conducted.

METHODS**Study design**

This was a prospective observational study.

Study setting

Hospital-based study centered at the Department of General Surgery, Government Medical College Hospital, Kottayam.

Study duration

Twelve months after getting IRB clearance (November 2021–November 2022).

Inclusion criteria

All carcinoma pancreas patients underwent surgical procedures, who were admitted to the general surgery ward of Kottayam Medical College.

Exclusion criteria

Patients with age <18, (uncommon age for carcinoma pancreas).

Method of study

After getting approval from IRB written informed consent would be taken from all patients undergoing study. This study includes observation of levels of CA 19-9 among all carcinoma pancreas patients (operable and non-operable), who were admitted to the Department of General Surgery in Medical College, Kottayam. All patients will be assessed according to the following protocol.

Protocol

(1) Detailed history (2) Complete clinical examination (3) CT scan findings (4) CA 19-9 values and (5) Intraoperative findings.

CA 19-9 is now being done routinely for all carcinoma pancreas patients. Collect that data and observe whether the carcinoma is resectable or not. Observe the value of CA 19-9 among the resectable and non-resectable groups. Check for any relation between resectability and CA 19-9 value. Collected data will be recorded on a case record form and subjected to statistical analysis. During every phase of the study, the personal details of the patients participating in the study shall be kept confidential and the patient has every right to withdraw at any phase of the study without affecting his/her future treatment.

Data analysis

Data were entered in Microsoft Excel and analyzed using Statistical Packages for the Social Sciences software version 18.

RESULTS

In my study, it was observed that carcinoma pancreas is a disease of the elderly. Most incidences are found in patients above 60 years.

Table 1: Age distribution in carcinoma pancreas

Age in years	Frequency	Percent
<50	6	8.7
51-60	20	29
61-70	26	37.7
>70	17	24.6
Total	69	100

Table 2: Gender distribution in carcinoma pancreas

Sex	Frequency	Percent
Male	47	68.1
Female	22	31.9
Total	69	100

Table 3: Unresectability based on metastasis

Inoperable based on intraoperatively showing metastasis	Frequency	Percent
No	45	65.2
Yes	24	34.8
Total	69	100

Table 4: Unresectability based on unreconstructible vascular invasion

Inoperable based on intraoperative shows unreconstructible vascular invasion	Frequency	Percent
No	56	81.2
Yes	13	18.8
Total	69	100

Table 5: Relation between CA 19-9 and unresectability based on vascular invasion

CA 19-9	Inoperable based on intraoperative shows unreconstructible vascular invasion				Total	χ^2	df	p	
	No		Yes						
	N	%	N	%					
<100	5	8.9	1	7.7	6	8.7	2.57	3	0.463
101-500	32	57.1	5	38.5	37	53.6			
501-1000	18	32.1	6	46.2	24	34.8			
>1000	1	1.8	1	7.7	2	2.9			
Total	56	100	13	100	69	100			

CA 19-9: Cancer antigen 19-9

In the study, it was observed that more incidence is in male gender. The chance of bias will be there, as preoperatively non-operable cases were not included in this study.

In the study, there is around 34.8% of patients are unresectable due to metastasis. As metastasis becomes one of the leading causes of poor prognosis in the case of carcinoma pancreas.

In the study there is around 18.8% of patients are unresectable due to unreconstructible vascular invasion. Furthermore, becoming a leading cause of poor prognosis in the case of carcinoma pancreas.

By analyzing my study, it was found that, as the "p">0.05, the relation between CA 19-9 and inoperability based on unreconstructible vascular invasion is not significant. Even considering 500 as a cutoff value for CA 19-9, the sensitivity and specificity of the CA 19-9 in predicting unresectability are found low. Making it a bad tool for predicting unresectability in carcinoma pancreas.

By analyzing my study it was found that, as the "p">0.05, the relation between CA 19-9 and inoperability based on metastasis is not significant. Even considering 500 as a cutoff value for CA 19-9, the sensitivity and specificity of the CA 19-9 in predicting unresectability are found low. Making it a bad tool for predicting unresectability in carcinoma pancreas.

In my study, it was observed that around 45.2% of unresectable cases and around 31.6% of resectable cases of carcinoma pancreas having CA 19-9 values >501. Making it a less predictable factor for the unresectability of carcinoma pancreas.

CA 19-9 as a tumor marker has been proven to be useful in predicting outcomes and in follow-up of patients with carcinoma of the head of the pancreas. With the lack of definitive evidence regarding the role of CA 19-9 in predicting operability in a case of carcinoma of the pancreas, I have chosen to analyze the same in a prospective study including 69 patients who underwent surgery for carcinoma pancreas, either curative or palliative.

Of the 69 cases, 63 patients were above 50, and only six patients were found to be younger than 50. Pancreatic cancer is found to be a disease of the elderly. The incidence of pancreatic malignancies was found more common in males. Male gender preponderance was noted.

As a part of the pre-operative evaluation contrast-enhanced CT (CECT) of the abdomen and pelvis and serum CA 19-9 levels were done routinely. Of the 69 patients, four patients were found to be non-resectable preoperatively by CECT abdomen. Of those four patients two patients found elevated CA 19-9 levels of more than 501 and the other two had values <500. Hence CA 19-9 was found to be irrelevant in predicting non-resectability on a CECT basis.

When the 69 patients were taken up for surgery it was found that 38 were operable and they underwent classical Whipples pancreaticoduodenectomy. In the other 31 patients, the tumor was

Table 6: Relation between CA 19-9 and unresectability based on metastasis

CA 19-9	Inoperable based on intraoperative shows metastasis				Total	χ^2	df	p	
	No		Yes						
	N	%	N	%					
<100	5	11.1	1	4.2	6	8.7	1.15	3	0.764
101-500	24	53.3	13	54.2	37	53.6			
501-1000	15	33.3	9	37.5	24	34.8			
>1000	1	2.2	1	4.2	2	2.9			
Total	45	100	24	100	69	100			

CA 19-9: Cancer antigen 19-9

Table 7: Distribution of Ca 19-9 in unresectable cases

CA 19-9	Inoperable based on intraoperative showing either metastasis or unreconstructible vascular invasion	
	Frequency	Percent
>501	14	45.20
<500	17	54.80
Total	31	100.00

CA 19-9: Cancer antigen 19-9

Table 8: Distribution of CA 19-9 in resectable cases

CA 19-9	Resectable cases of carcinoma pancreas	
	Frequency	Percentage
>501	12	31.6
<500	26	68.4
Total	38	100

CA 19-9: Cancer antigen 19-9

deemed non-resectable and a palliative bypass procedure was done. Among the 31 patients whose tumors were non-resectable, only four were diagnosed non-resectable preoperatively with CECT, and the other 27 were found to be non-resectable only during surgery. Of the 31 non-resectable cases 14 (45.2%) patients had elevated CA 19-9 values of more than 501 and the rest 17 (54.8%) patients had low CA 19-9 values.

Among the 31 non-resectable cases 24 patients had metastasis and 13 patients had unreconstructible vascular invasion intraoperatively. In 24 patients with metastasis, 10 cases had elevated CA 19-9 more than 501, and 14 had low values. In the 13 patients with unreconstructible vascular invasion, 7 cases had elevated CA 19-9 more than 500, and 6 had low values. Among the 38 resectable cases, 12 patients (31.6%) had elevated CA 19-9 more than 501 and 26 patients (68.4%) had low values. Among nonresectable cases, 45.2% had raised CA 19-9 and among operable cases, 31.6% showed raised CA 19-9. Hence CA 19-9 seems to be an insignificant predictor of tumor resectability.

CONCLUSION

It was found that the need for a pre-operative predictor for resectability of carcinoma pancreas is relevant while considering mortality and morbidity in operating carcinoma pancreas cases. On evaluating CA 19-9 as a pre-operative predictor we found that CA 19-9 has no significant role as an indicator of local advancement or metastasis.

Hence we cannot consider CA 19-9 as a predictor of resectability of carcinoma pancreas preoperatively.

AUTHOR'S CONTRIBUTION

Conceptualization, final review: Dr. Jijinraj P, Dr. Renjin RP. Methodology: Dr. Jijinraj P, Dr. Renjin RP. Formal analysis, data collection, writing, original draft preparation: Dr. Jijinraj P, Dr. Renjin RP.

CONFLICT OF INTEREST

The authors declare no conflicts of interest associated with this research.

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