ORIGINAL RESEARCH PAPER

Surgery

DIAGNOSTIC ACCURACY OF SERUM CEA & CA19.9 IN CARCINOMA OF GALL BLADDER AND CHOLANGIOCARCINOMA : A SINGLE CENTER EXPERIANCE.

KEY WORDS: CaGB-Cholangiocarcinoma-CEA-CA19.9-Diagnostic accuracy.

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ABSTRACT

Background : The incidence of Carcinoma of Gall bladder(CaGB) and Cholangiocarcinoma (CC) are extremely high in Asia. The North of India and its north east regions have high incidence of both the cancers. Numerous studies reported that serum carbohydrate antigen 19-9 (CA19-9) and CEA plays a role in the diagnosis and followup of CCA and Ca GB .The aim of this study was to examine the diagnostic accuracy of CEA & CA19-9 for CCA and Ca GB. **Materials and Methods:** In this retrospective study 70 patients with Ca GB and 30 patients with CCA who had undergone treatment at a state cancer Institute in Northe east India during 2020 -2022 were included. Laboratory data of serum CEA and CA19-9 against diagnosis of Ca GB and CCA were collected using hospital record system. The diagnostic sensitivity (SEN), specificity (SPE), diagnostic odds ratio (DOR), mean and standard deviations were compared between CEA and Ca19.9 in both the groups of CaGB and Cholangiocarcinoma. **Results:** The Sensitivity of CEA in diagnosing Ca GB was 0.58 ; specificity was 0.53 ;diagnostic odds ratio was 1.6 with the mean of 22 and Standard Deviation (SD)of ±50. The Sensitivity of CEA in diagnosing Cholangiocarcinoma was 0.56; specificity was 0.41; daignostic odds ratio was 0.93 with the mean of 7 and Standard Deviation of (SD) of ±44. The Sensitivity of CA19.9 in diagnosing Ca GB was 0.55 ; specificity was 0.2 diagnostic odds ratio was 0.3 and mean of 560 with standard Deviation (SD) of ±400. The Sensitivity of CA19.9 in Cholangiocarcinoma was 0.83 ; specificity was 0.3. The diagnostic odds ratio was 4 and mean was 440 with Standard Deviation (SD) of ±360. **Conclusions:** These data suggest that the CEA has low specificity and sensitivity for diagnosis of CaGB and cholangiocarcinoma. The CA19.9 is more sensitive in Cholangiocarcinoma.

INTRODUCTION:

Cholangiocarcinoma (CC) is a malignant tumour arising from bile duct epithelium. Pathological diagnosis of CC is difficult because of its location, size & desmoplastic characteristic (1,2,3). On the other hand, CAGB is most common malignancy of biliary tract, usually presents in advanced stages due to lack of any typical clinical features and only 10%of them are candidates for curative surgery(4,5).These tumor masses are often not even identifiable by CT, USG or MRI (6,7,8). TheEndoscopic approaches are of limited usefulness in tissue diagnosis. No screening test or definitive tumor marker for diagnosis & prognosis is available(9,10). However certain tumor markers such as CEA and CA19.9 are associated with hepatobiliary pathologies. These markers when combined with clinical and imaging findings may guide its diagnosis and further plan of management.These tumor markers have been investigated for the diagnosis of malignancies in stomach, colon, pancreas but have not been gained widespread use in hepatobiliary pathologies (11,12). The objective of this study was to examine the clinical usefulness of CEA and CA19.9 for diagnosis of CaGB and Cholangiocarcinoma.

Table 1: Demography

Descriptions	Sex		Mean age
	Male	Female	
Carcinoma GB(CaGB)	46	24	57.5
Cholangiocarcinoma (CCA)	16	14	58.1

MATERIALS AND METHODS:

In this retrospective study 70 patients with CAGB and 30 patients with Cholangiocarcinoma who had undergone treatment at a Cancer Institute in N E India during 2020 – 22 were included.There were 46 male and 24 female patients with CaGB in an average age of 57 years. Amongst the patients with cholangiocarcinoma the average age was 58 years. There were 16 male and 14 females in the group. Reports were collected using hospital record system. sensitivity, specificity and diagnostic odd ratios were calculated for CEA and CA19.9 for both the situations. Spearman correlation test was used to ascertain strength of correlation between CA19.9 levels and CEA. Pre-defined cutoff values for CEA of 0-5ng/L and CA19.9 of 0-37u/ml specified by institutional laboratory were used for references.

RESULTS:

There is a greater number of male patients (46) in Ca GB with mean age of 57.5 (Table 1). The Table2 shows the specificity, sensitivity and diagnostic odd ratio for CaGB in relation to CEA and Ca19.9.Similarly, Table 3 shows the specificity, sensitivity and diagnostic odd ratio inrelation to CEA and Ca19.9 in relation to Cholangiocarcinoma.

The Sensitivity of CA19.9 in diagnosing Ca GB was 0.55; specificity was 0.2 ; diagnostic odds ratio was 0.3 and mean value of Ca19.9 in patients with CA GB was 560 with Standard Deviation (SD) ±400. Sensitivity of CEA in Ca GB was 0.58; specificity was 0.53; diagnostic odds ratio was 1.6 and mean of CEA in patients with CA GB was 22 with Standard Deviation (SD) ±50.). The CEA was raised in 41 cases (41%) and the Ca19.9 was raised in 59 (59%) cases of Ca GB in the study group (Table 2, Fig1,2). Therewas no significant co-relation between CEA and CA19.9 in this group (Fig 3).

Table 2 : Mean value of CEA and CA19.9 in CaGB

Descriptions	Mean value	Specificity	Sensitivity	Diagnostic Odd Ratio	SD
CEA	22	0.58	0.53	1.6	50
CA19.9	560	0.2	0.55	0.93	400

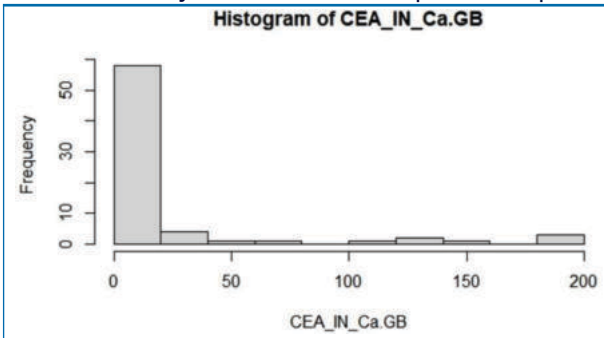

Fig 1 : Histogram of CEA in CaGB

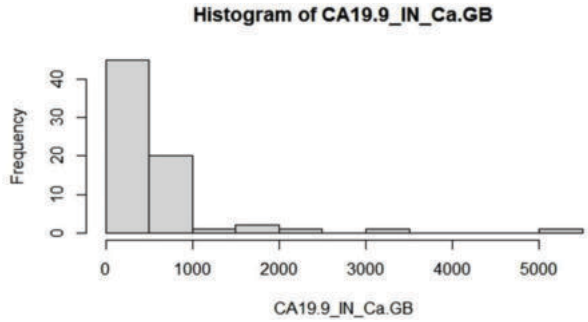

Fig 2: Histogram of CA19.9 in CaGB

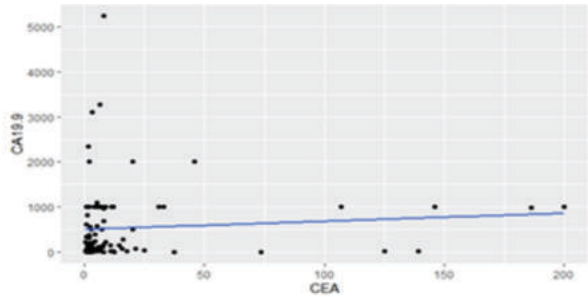

Fig 3 Scatter plot Correlation between CEA & Ca19.9 in Cholangiocarinoma

The Sensitivity of CEA in Cholangiocarcinoma was 0.56; specificity was 0.41; diagnostic odds ratio was 0.93 with and mean value of7 and Standard Deviation (SD) of ±44 The Sensitivity of CA19.9 in diagnosing Cholangiocarcinoma was 0.83 ; specificity was 0.3 ;diagnostic odds ratio was 4 and mean of in patients with Cholangiocarcinoma was 440 with Standard Deviation (SD) ±360 Table 3,Fig 1 The CEA was raised in 17 cases (56%) and the Ca19.9 was raised in 25 (83%) cases of cholangiocarcinoma in the study group(Table 3,Figs 4,5).There is not much co relation between CEA and CA19.9 in diagnosis of Cholangiocarcinoma(Fig 6).

Table3: Mean value of CEA and CA19.9 in Cholangiocarcinoma

Descriptions	Mean value	Specificity	Sensitivity	Diagnostic Odd Ratio	SD
CEA	7	0.41	0.56	0.93	44
CA19.9	440	0.2	0.83	4	360

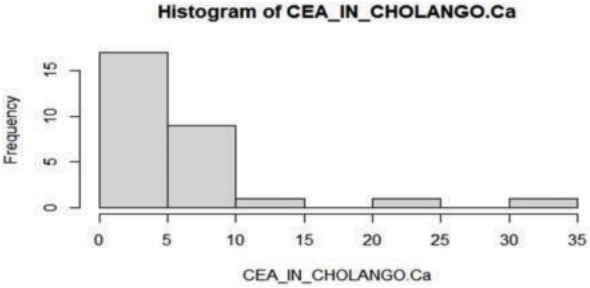

Fig 4: Histogram of CEA in CCA

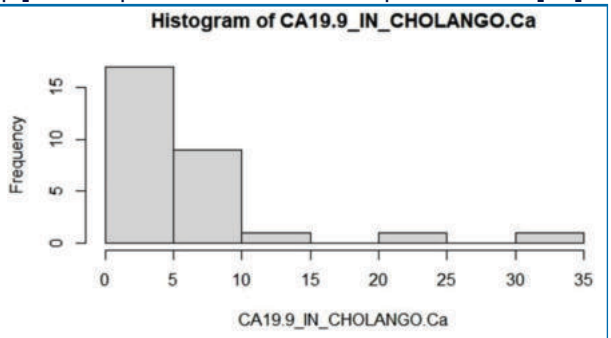

Fig 5: Histogram of Ca19.9 in Cholangiocarcinoma

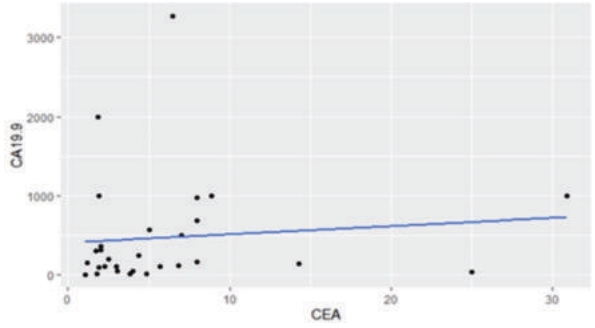

Fig 6 : Scatter plot Correlation between CEA & Ca19.9 in Cholangiocarinoma

DISCUSSION:

The serum CA19-9 has been commonly used in the diagnosis of pancreatic and biliary malignant diseases (13). Its usefulness has been demonstrated in diagnosis,staging, assessment of prognosis and recurrence [14-20]. Elevated concentration of serum CA19-9 (> 37 KU·L-1) in bile duct cancers has been frequently reported(21). A positive rate of high CA-19.9 has been reported in 68% to 97% in patients with cholangiocarcinoma in various studies(22,23). In the present study an elevation of CA19-9 was found in 29% of patients with cholangiocarcinoma.The high in sensitivity (0.83) which was similar to other study (24). However, specificity of 0.2 did not correlate with specificity value of 81.4% reported in the same study [24]. The concentration of CA19-9 could raise in patients with benign inflammatory conditions and in CaGB as well. [25-28]. The CA19-9 was synthesized by normal biliary ductal cells and malignant cells (29). If bile flow is blocked by biliary obstruction in benign or malignant conditions, epithelial cells will proliferate markedly. As a result, more CA19-9 may be secreted and leaked out into the bloodstream. An elevated CA19-9 level often returns to normal with appropriate decompression of the common duct or relief of acute cholangitis. The increase of CA19-9 in benign diseases is usually not significant and a concentration of CA19-9 exceeding 480 KU□L-1 is rare. In our study 66%of patients with Cholangiocarcinoma and 55% with CaGB exhibited CA19-9 levels > 440 and >560 u/dl respectively. The CEA is mainly secreted by digestive glandular cancer cells and their metastases. It has also been found in other types of cancer such as breast, lung, ovary, thyroid cancers. The sensitivity and specificity of serum CEA in our study were 56% and 41% respectively in Cholangiocarcinoma and CaGB, which were similar to 63.3% and 78.4% reported in other study[30]. The present study had shown a much higher sensitivity with serum CA19-9 than that of serum CEA in cases withcholangiocarcinoma. Asmall correlation between the levels of serum CEA and CA19-9 was found in both the sub groups.

Limitation: This study has the limitation of being a retrospective one performed in single center with a small sample size. Statistical analysis were not possible. However it determines the usefulness of estimation of tumour makers in suspected CaGb and Cholangiocarcinoma.

CONCLUSIONS:

The CEA has both low specificity and sensitivity for CaGB . The sensitivity was found to be high with serum CA19-9 in cases with cholangiocarcinoma. The estimation of these tumour markers may be utilized as an useful additional diagnostic tests especially with that of imaging study.

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