

CANCER ANTIGEN (CA) 19.9

INTRODUCTION

Pancreatic cancer is the fourth leading cause of cancer death and is associated with a poor prognosis. Infiltrating ductal adenocarcinomas account for vast majority of cases and arise most frequently in the head of pancreas. At the time of diagnosis 85-90% of patients have inoperable or metastatic disease. CA19.9 is a modified Lewis (a) blood group antigen which is elevated in approximately 70-80% patients with Pancreatic carcinoma.

NORMAL RANGE

<37 U/mL

CLINICAL USE

- For detection, diagnosis and prognosis of pancreatic cancer
- As an indicator of asymptomatic recurrence in patients with completely resected tumors
- As a biomarker of response in patients with advanced disease undergoing chemotherapy
- Preoperative CA19.9 levels correlate with tumor stage, hence may be used for staging
- As a useful adjunct to CEA for diagnosis & detection for early recurrence of certain cancers
- May indicate development of Cholangiocarcinoma in patients with Primary sclerosing cholangitis

INTERPRETATION

Increased Levels

- Carcinoma of pancreas (80%)
- Hepatobiliary cancer (20-51%)
- Gastric cancer (42%)
- Colon cancer (20%)
- Non cancerous conditions – Pancreatitis, Cirrhosis, Cholangitis, Hepatitis & Non malignant Gastro-Intestinal diseases

HIGH RISK FACTORS FOR PANCREATIC CANCER

- Cigarette smoking – 20-25% cases of pancreatic cancer
- Chronic pancreatitis
- Diabetes
- Excessive consumption of alcohol

- Peutz-Jeghers syndrome with mutation in STK11 gene
- Familial pancreatic cancer

EARLY DETECTION OF PANCREATIC CANCER

Screening by CA19.9 & CEA is recommended in –

- Family members with ≥ 3 first degree relatives with pancreatic cancer
- Patients with Familial atypical multiple mole–melanoma (FAMMM) syndrome, Peutz – Jeghers syndrome and Hereditary Pancreatitis

LABORATORY DIAGNOSIS

- Imaging studies like Ultrasound / CT / ERCP – correctly diagnoses or rules out carcinoma pancreas in $>90\%$ cases
- Histopathology & Brush cytology – Ultrasound guided needle biopsy has a reported sensitivity of 80-90%
- Blood biomarkers –
 - CA19.9 – has a sensitivity of 70% and specificity of 87%. There is no difference in sensitivity between local disease and metastatic disease. Usually detects tumor recurrence 2-20 weeks before clinical evidence.
 - CEA – also increased in pancreatic carcinomas. CEA level in bile obtained by percutaneous transhepatic drainage is increased in 76% cases.
 - Testosterone : Dihydrotestosterone ratio < 5 in $>70\%$ of men with pancreatic cancer usually in Stage I tumors
 - Serum Amylase & Lipase-slightly increased in early stages of pancreatic cancer in $<10\%$ cases
 - Glucose tolerance – diabetic curve with overt diabetes in 20% cases of pancreatic cancer. Unstable insulin sensitive diabetes developing in an older male should arouse suspicion of carcinoma pancreas
 - Serum Alkaline phosphatase – increased in 60% cases of pancreatic cancer with liver metastasis or biliary duct obstruction
- Molecular markers-
 - KRAS mutation affecting codon 12-seen in 60-75% cases of pancreatic carcinoma
 - Deletion of p16 gene locus on chromosome 9p21 – seen in 95% cases
 - Inactivation / Deletion of p53 gene – seen in 50-70% cases
 - Deletion of SMAD4 gene – seen in 55% cases

LIMITATIONS

- Individuals (5-10% population) with blood group antigen Lewis (a-b-) do not synthesize CA19.9
- Different assays do not produce equivalent values and should not be used interchangeably.