Global Scientific JOURNALS

GSJ: Volume 11, Issue 9, September 2023, Online: ISSN 2320-9186

www.globalscientificjournal.com

JOINT VENTURE OF GOVERNMENT OF GUJARAT AND THE GUJARAT CANCER SOCIETY
THE GUJARAT CANCER & RESEARCH INSTITUTE
(M. P. SHAH CANCER HOSPITAL) STATE CANCER INSTITUTE
Affiliated to B. J. Medical College, Ahmedabad
(Recognised by Ministry of Health & Family Welfare, Government of India)

THE GUJARAT CANCER & RESEARCH INSTITUTE

(M. P. SHAH CANCER HOSPITAL) STATE CANCER INSTITUTE)

Affiliated to B. J. Medical College, Ahmedabad

(Recognised by Ministry of Health & Family Welfare, Government of India)

Student : Hariom Rajput*,Teena Rajput

Healthcare Professional ID: 71-8301-5661-6876

TOPICS : PANCREATIC TUMORS

Paper type : Research Paper

Prepared By Hariom Rajput

Gmail :hariomraj9171494082@gmail.com

1. Abstract :

Pancreatic cancer is a highly aggressive and often lethal malignancy that arises in the pancreas, an essential organ for digestion and blood sugar regulation. It typically exhibits minimal early symptoms, leading to late-stage diagnoses. Risk factors include smoking, obesity, family history, and certain genetic mutations. Treatment options vary depending on the stage but may involve surgery, chemotherapy, and radiation therapy. Early detection remains a challenge, and research into more effective treatments and screening methods continues to be a priority in the fight against pancreatic cancer.In the paper are show full over view about the pancreatic cancer like as types and according to parts or about the graphical form are used in the paper.These are paper show the numerical form about the patients and how to prevent it including in the paper or microscopic photos, CT scan photos are beneficial effective the paper.[SELF]

2. Introduction :

Glands are organs that produce and release substances in the body. [1]The pancreas performs two main functions: Exocrine function: Produces substances (enzymes) that help with digestion. Endocrine function: Sends out hormones that control the amount of sugar in your bloodstream butPancreatic cancer is a type of cancer that originates in the pancreas, an organ located behind the stomach.[2] It's often diagnosed at an advanced stage, making it difficult to treat. Symptoms can include abdominal pain, weight loss, jaundice, and digestive issues.[3]Early detection is crucial for better treatment outcomes. If you or someone you know has concerns about pancreatic cancer, it's important to consult a medical professional.Pancreatic cancer is a type of cancer that originates in the cells of the pancreas, an organ located in the abdomen. It often has a high mortality rate because it's often diagnosed at an advanced stage. Symptoms may include abdominal pain, weight loss, and jaundice.[17] Treatment options can include surgery, chemotherapy, radiation therapy, and targeted therapies. Early detection is crucial for improving the chances of successful treatment.[18]

3. Exocrine Tumors : [National Library Of Medicine]

Exocrine tumors of pancreas include adenocarcinoma.[1][4][8] Other pancreatic exocrine tumors include serous cystic neoplasms, mucinous cystic neoplasms, solid pseudopapillary neoplasms, and pancreatoblastomas.[9]

4. Pancreatic Adenocarcinoma :

Pancreatic duct adenocarcinoma is the most common malignancy of gastrointestinal tract with high death rate.[14] The majority of pancreatic carcinomas arise from pancreatic duct epithelium. Acinar cell carcinoma is much less common. It is most often silent before widespread dissemination occurs. Death usually results within 1 year. Ductal carcinomas elicit an intense desmoplastic response.[3]

5.Predisposing Factors:[National Cancer Institute NCI]

5.1Cigarette smoking: It is the most important risk factor in the development of pancreatic adenocarcinoma.[6][15]

5.2 Chemicals Exposure: Consumption of smoked meat and fish intake containing polycyclic hydrocarbons increases risk of pancreatic carcinoma.Indirect acting chemical carcinogens associated with pancreatic cancer are shown in Table A.[14]

Table A Indirect acting chemical carcinogens associated with pancreatic cancer.

Chemical carcinogen	Examples	Associated cancers	
Polycyclic hydrocarbons	Smoked meat and fish intake	Pancreas carcinoma Oral carcinoma	
		Cigarette smoke	Esophagus carcinoma (middle and distal) Lung carcinoma Renal pelvis transitional cell carcinoma

		Urinary bladder transitional cell carcinoma

5.3 Parasite: Schistosoma haematobium also increases risk of pancreatic carcinoma.Parasite associated with pancreatic carcinoma is shown in Table B.[18]

Table B Parasite associated with pancreatic carcinoma.

Parasite	Associated tumors
Schistosoma harmatobium	Pancreatic carcinoma Squamous cell carcinoma of the urinary bladder

5.4 Other factors: Chronic pancreatitis, diabetes mellitus and alcoholism have been associated with an incre ased risk of pancreatic cancer.[2][7] Consumption of high fat diet has also been implicated but less common.

5.5 Familial syndromes: Several familial syndromes increasing the risk of pancreatic adenocarcinoma include Lynch syndrome, Peutz-Jeghers syndrome (STK11/LB1 gene on chromosome 19p13), hereditary pancreatitis (PRSS1 gene), familial atypical mole melanoma syndrome (p16 gene, chromosome 9p21). BRCA2 gene mutation (13q12-q13), familial pancreatic cancer syndrome and Fanconi anemia component genes.[9][13]

6. Molecular Genetics (main heading):[Molecular Targeted Therapies in Pancreatic Cancer]

Oncogenes, their mode of activation and associated cancers are shown in Table C . Tumor suppressor gene mutations associated with pancreatic carcinoma are shown in Table D.[12]

Table C : Oncogenes, their mode of activation and associated cancers (signal-transducing proteins)

Category	Proto-oncogene	Mode of activation	Associated malignancies
GTP-binding (G) proteins	K-RAS	Point mutation	Pancreas carcinoma Colon carcinoma Lung carcinoma

Gene	Protein	Function	Familial tumors	Sporadic cancers
Mitogenic signaling pathway inhibitors				
APC	Adenomatous polyposis protein (locus 5p21) Mutation by deletion or nonsense.	APC inhibits Wnt signaling activator pathway, thus prevents nuclear transcription. It degrades catenin.	Familial polyposis coli with malignant transformation.	Pancreas carcinoma Colon carcinoma Gastric carcinoma Thyroid carcinoma Melanoma.
SMADA2 SMADA4 Cell cycle progression inhibitors	SMADA2 protein SMADA4 Protein.	Both inhibit TGF-B signaling pathway. These repress CDK4 and MYC. These also induce expression of CDK inhibitor.	Juvenile polyposis.	Pancreas carcinoma (55%) Colon carcinoma.

CDKN2A <u>Angiogenesis inhibitors</u>	P16/INK4a and P14ARF	P16 inhibits CDK, P14 indirectly activates p53 tumor suppressor Gene.	Familial melanoma.	Pancreas carcinoma Breast carcinoma Esophagus carcinoma.
STKIT	Liver kinase or STK11 B1 (LKB1	It activates AMPK family of kinases. It suppresses cell growth when cell nutrients and energy levels are low.	Peutz-Jeghers syndrome cancers of GIT and pancreas.	Diverse carcinomas in 5-20% of cases.

Table D. Tumor suppressor genes associated with pancreatic carcinoma.

<u>6.1 K-RAS signal-transducing proteins :</u>Point mutation of K-RAS (chromosome 12p) has been identified in Pancreas (90%), colon (50%), and lung (30%).

<u>6.2 SMADA4 tumor suppressor gene (chromosome 18q):</u> SMADA4 tumor suppressor gene is also known as DPC4. Mutation of DPC4 (deletion) has been demonstrated in 55% of pancreatic cancers.[9][11]

<u>6.3 BRCA2 gene (chromosome 13g):</u> BRCA2 tumor sup pressor gene mutation has been associated with pancreatic cancers.

<u>6.4 APC gene (chromosome 5p21):</u> Mutation of APC tumor suppressor gene (deletion and nonsense) has been demonstrated in sporadic cancers (colon, stomach and pancreas) and familial adenomatous polyposis developing colon cancer.

6.5 TGF-B tumor suppressor gene: TGF-ß tumor suppressor gene inhibits G1 to S phase of cell cycle. Mutation of TGF-ß has been demonstrated in pancreatic cancer.[11][15][18]

7. Evolution of Pancreatic Adenocarcinoma:[Pancreatic cancer evolution and heterogeneity]

Pancreatic carcinoma is a genetic disease of inherited or acquired gene mutations. Accumulation of multiple mutations of various genes is most important than their occurrence in a specific order.

7.1 Early stage: It is thought that telomerase shortening and point mutation of K-RAS (12p) oncogene is an early event in most cases of pancreatic intraductal neoplasia in more than 90% of cases.[9]

7.2 Intermediate stage: There is inactivation of the p16 tumor suppressor gene (CDKN2A on chromosome 9p) in more than 95% of cases.[18]

7.3 Late stage: Inactivation of p53, SMAD4 (DPC4 on chromosome 18q) in 55% and BRCA2 (13q) tumor suppressor gene occurs in 10%. It results in invasive carcinoma. Other less common gene mutations include LKB1/STK11 (19q), MKK4 (17p) and RB1 (13q).

8.Clinical Features:

Patient complains of abdominal dull pain constant in nature in upper abdomen radiating to the back, marked loss of weight and anorexia. Patient also mentions passage of dark-colored urine and clay-colored stool.[18]

8.1 Nonspecific symptoms: Patient may present with abdominal pain radiating to the back, weight loss and anorexia.[18]

8.2 Migratory thrombophlebitis: It occurs probably due to release of thrombogenic substances into the circulation (e.g. serine proteases) that initiate coagulation cascade in 10% of cases (Trousseau sign). The

8.3 Carcinoma arising in head of pancreas: It frequently obstructs common bile duct resulting in painless obstructive jaundice in 20% of cases. It

is often accompanied by a distended, palpable gallbladder g termed as Courvoisier sign in this setting.[5][18]

8.4 Carcinoma involving the pancreatic tail: It can cause islet destruction and secondary diabetes mellitus.

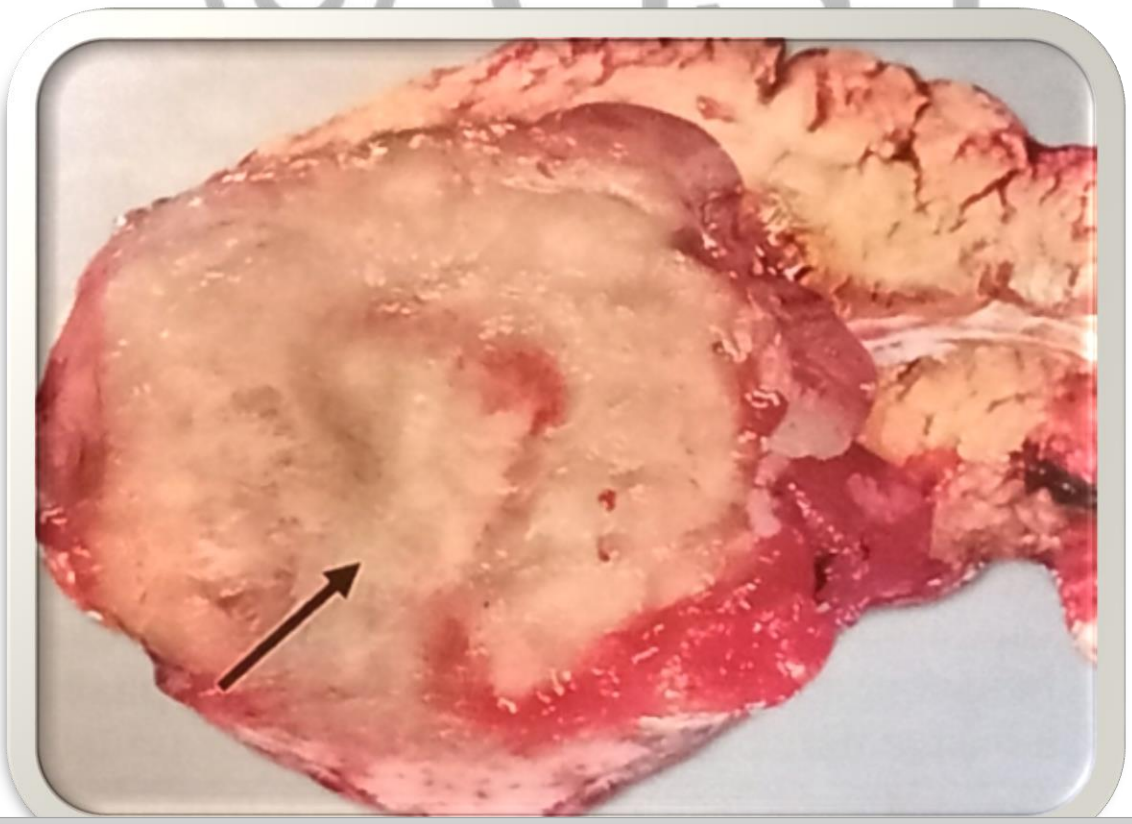
9 Physical Examination:

The classic presentations of pancreatic cancer are los of weight, jaundice, distended palpable gallbladder (Courvoisier sign).

9.1 Migratory thrombophlebitis (Trousseau sign): It occurs Probably due to release of thrombogenic substanceinto the circulation (eg serine proteases) that initiate The coagulation cascade in 10% of cases.[8]

9.2 Onstructie jaundice (Courvoisier sign): Carcinoma ansing in head of pancreas frequently obstructs common bile duct resulting in painless obstructive Jaundice in 20% of cases It is often accompanied by a distended, palpable gallbladder termed as Courvoisier sign in this setting.[5]

9.3 Secondary diabetes mellitus: Carcinoma involving the pancreatic tail can cause islet destruction and Secondary diabetes mellitus.[2][3][6]



Structure : Adenocarcinoma pancreas. Head of pancreas shows gray white

Laboratory Findings:

Laboratory tests are consistent with obstructive jaundice, i.e. conjugated hyperbilirubinemia with high 5' nucleosidase (specific marker for bile duct epithelial cell injury) and alkaline phosphatase. CA19-9 tumor marker is most often elevated (normal range <37 IU/ml).

Gross Morphology:

Pancreatic cancer occurs in various portions of pancreas: head (60%), body (15%) and tail (5%) of the gland. The tumor diffusely involves the entire gland.Tumor is usually hard, satellite, poorly circum- scribed and gray-white in color.

Light Microscopy:[Microscopic]

Most common histologic variant of pancreatic cancer is adenocarcinoma. Less common histologic variants include acinic cell, adenosquamous and poorly differentiated carcinoma.

Serum tumor markers in pancreatic cancer:

•CA19.5	• C peptide
•CEA	• IGFBP-1
• Glucagon	• Pancreatic polypeptide
• Insulin	• Serotonin
• Proinsulin	• ACTH

Immunohistochemistry of pancreatic adenocarcinoma:

Markers	Expression
• Vimentin	Positive
• Alpha-1 Antitrypsin	Positive
• Alpha -1Antichymotrypsin	Positive
• EMA,Cytokeratin	Negative

10.Morphology of pancreatic adenocarcinoma is Described as under.

- Cell morphology: Tumor is composed of pleomorphic small to bizarre cuboidal to columnar malignant cells forming abortive glandular structures or nests.

- Differentiation: Tumor is most often moderately to poorly differentiated adenocarcinoma irrespec- tive of location of tumor in pancreas (well differen- tiated rare).
- Fibrosis: Tumor cells infiltrate the wall resulting in dense stromal fibrosis.

Table 21.77: Differences between ductal adenocarcinoma of pancreas and chronic

Histopathological features	Ductal adenocarcinoma	Chronic pancreatitis
Histologic pattern	Haphazardly arranged	Lobular arrangement
Ruptured or incomplete glands	Present	Absent
Companion muscular vessel	Present	Absent
Nuclear pleomorphism	Marked in the same glands	Insignificant
Perineural invasion	Present	Absent
Invasion of blood vessels	Present	Absent
Mitoses	Frequent	Infrequent

Immunohistochemistry

Panel of markers is used to analyze expression in pancreatic adenocarcinoma on histopathological sections as shown in E.

• Invasion: Perineural invasion and lymphatic Invasion may be demonstrated.

Table E : Immunohistochemistry of duct adenocarcinoma Of pancreas.

Markers	Expression
Vimentin	Positive
Alpha- 1 antitrypsin	Positive
Alpha- 2 antichymotrypsin	Positive
EMA	Negative
Cytokeratin	Negative

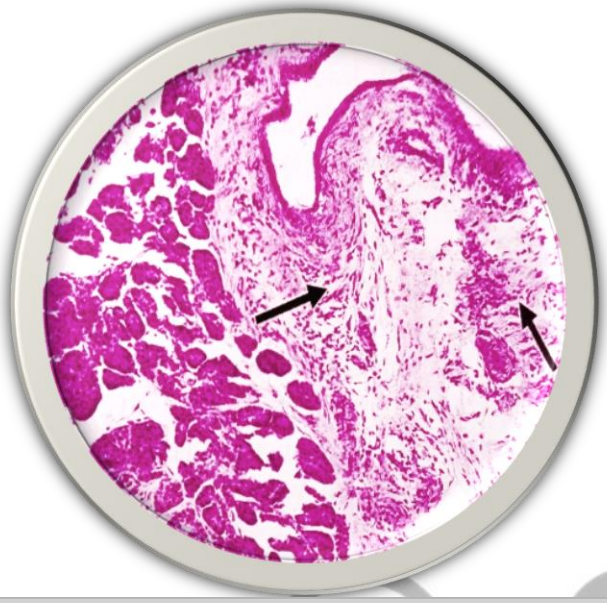


Fig. 21.113: Chronic pancreatitis shows infiltration by chronic inflammatory cells. Fibrosis is evident (arrows) (100X).

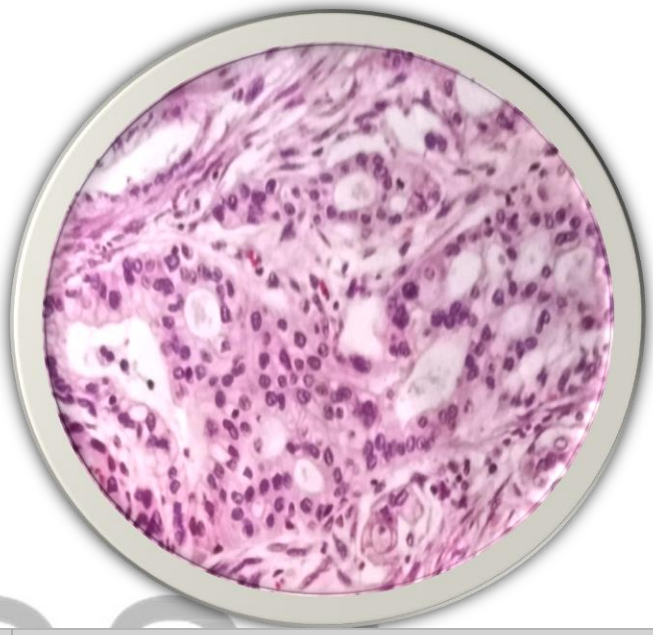


Fig. 21.117: Adenocarcinoma pancreas. Tumor is composed of pleomorphic small to columnar malignant cells forming abortive glandular structures or nests (400X).

11. Mode of Spread:

Pancreatic adenocarcinoma most often metastasiz to regional lymph nodes, liver, lung, pleura, intest and peritoneum.Moderately other common sites include adrenals, bones, gallbladder, diaphragm and kidney.[18]

12. CT Scan: [American cancer society]

CT imaging technique highlights early detection of pancreatic cancer, accurate staging and effective treatment of pancreatic cancer.[11][16][17]

13. Surgical Resection :

It is the only curative treatment option. Only 10-30% cancers are resectable at the time of presentation with a 5-year survival rate of 18-20%, and a median survival of these patients is 17-21 months.Patients with locally advanced disease have a median survival of 6-10 months.[18]

14. Pancreatoblastoma:

It is rare malignant pancreatic neoplasm most often affecting children up to 15 years of age.Light microscopy reveals squamous islands admixed with undifferentiated cells. Prognosis is better in comparison to that of pancreatic ductal Adenocarcinoma.[18]

15. ISLET CELL TUMORS:[Journal of Medical Case Reports]

15. 1 Glucagonoma :

Glucagonoma is rare neuroendocrine tumor of pancreatic a cells of pancreas. It results in secondary diabetes mellitus. Patient with a glucagonoma presents with necrotizing migratory erythema, mild hyperglycemia, and anemia.[9]14][18]

15.2 Insulinoma :

Insulinoma is the most common islet cell tumor derived from ß cells of pancreas. It is low-grade malignant neoplasm. [11]It synthesizes excess of insulin resulting in hypoglycemia.Insulinoma synthesizes insulin by splitting of C-peptide fragment of the proinsulin molecule resulting in increased serum C-peptide level (diagnostic tool).Purification of commercial insulin preparations is done by splitting of C-peptide fragment of proinsulin. Hence, exogenous administration of insulin does not increase C-peptide.[13]

15.2.1 Clinical Features:

Symptoms of hypoglycemia as a result of episodic hyperinsulinemia include hunger, sweating, irritability, epileptic seizures, and coma.It is known as Whipple triad. Glucose administration dramatically causes reversal of central nervous system abnormalities.

15.3 Gastrinoma:

This malignant tumor derived from G cells is most often located in the pancreas. It may also occur in duodenum. It synthesizes excess of gastrin resulting in increased serum gastrin levels.[15]

15.3.1 Clinical Features:

Gastrinoma of pancreas results in Zollinger-Ellison syndrome characterized by gastric hypersecretion of hydrochloric acid, recurrent peptic ulcer disease of the duodenum and sometimes the jejunum, and elevated levels of gastrin in blood.

15.4 Stomatostatinoma :

Stomatostatinoma is islet cell tumor derived from S cells of pancreas. Normally, & cells of pancreas secrete somatostatin hormone that inhibits the release of insulin by pancreas. Somatostatin also inhibits the pituitary release of growth hormone. It decreases secretion, motility and absorption in the digestive tract.[7][11][18]

15.4.1 Clinical Features:

Excess synthesis of somatostatin hormone by tumor results in mild diabetes mellitus, gallstones, steatorrhea, and hypochlorhydria.

16. Different parts are denoted in the curve with Pancreatic cancer.

The pancreas is divided into several regions, which include:[Researchgate]

A)Head: This is the rightmost part of the pancreas, closest to the small intestine and the bile duct. Cancers in the pancreatic head can sometimes block the bile duct, leading to jaundice.

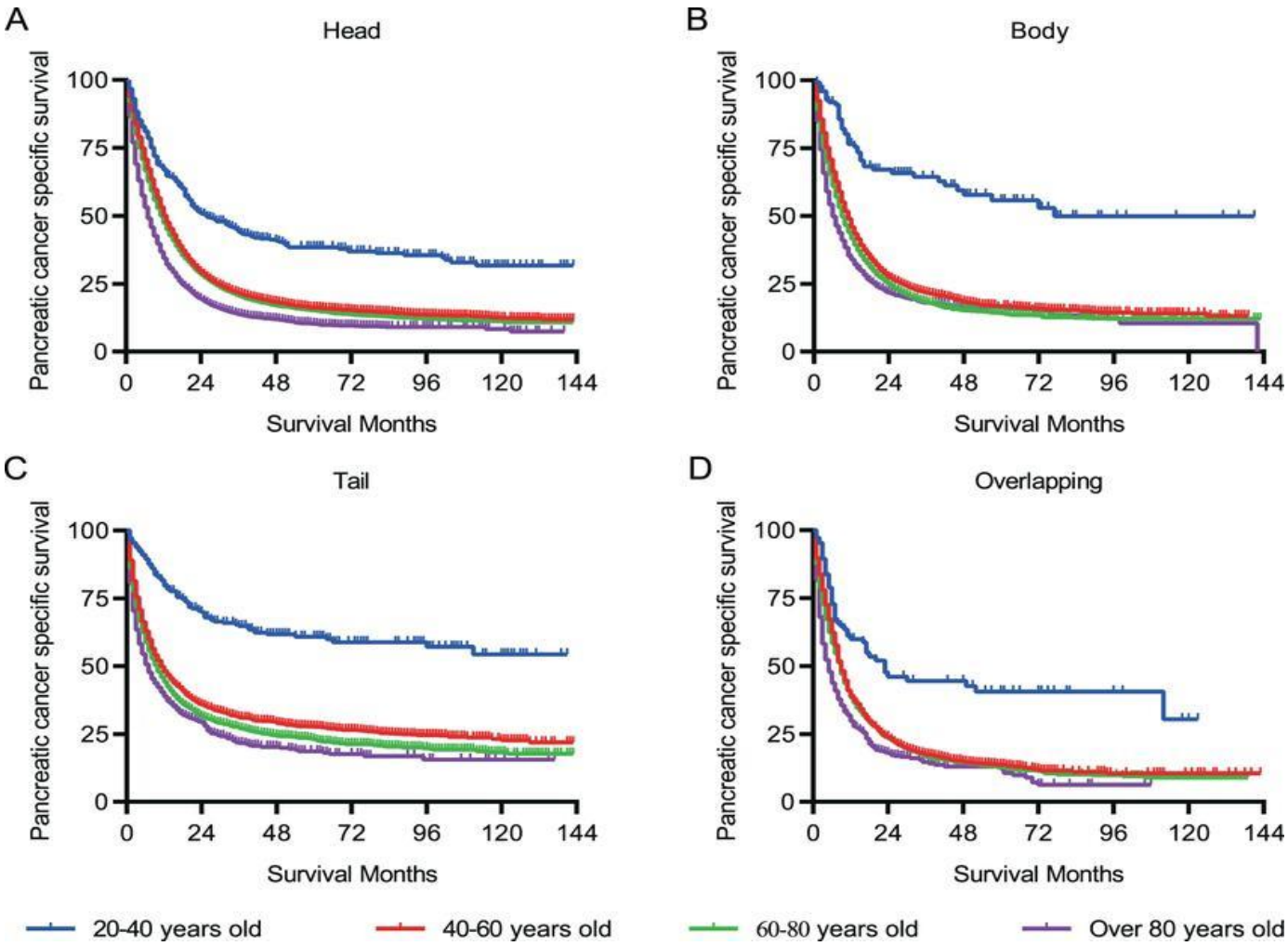
B)Body: The body of the pancreas is the middle section. Pancreatic cancer can develop here as well.

C)Tail: The tail of the pancreas is the leftmost part. Tumors can also originate in the pancreatic tail.

The location of the tumor within the pancreas can affect symptoms, treatment options, and prognosis.

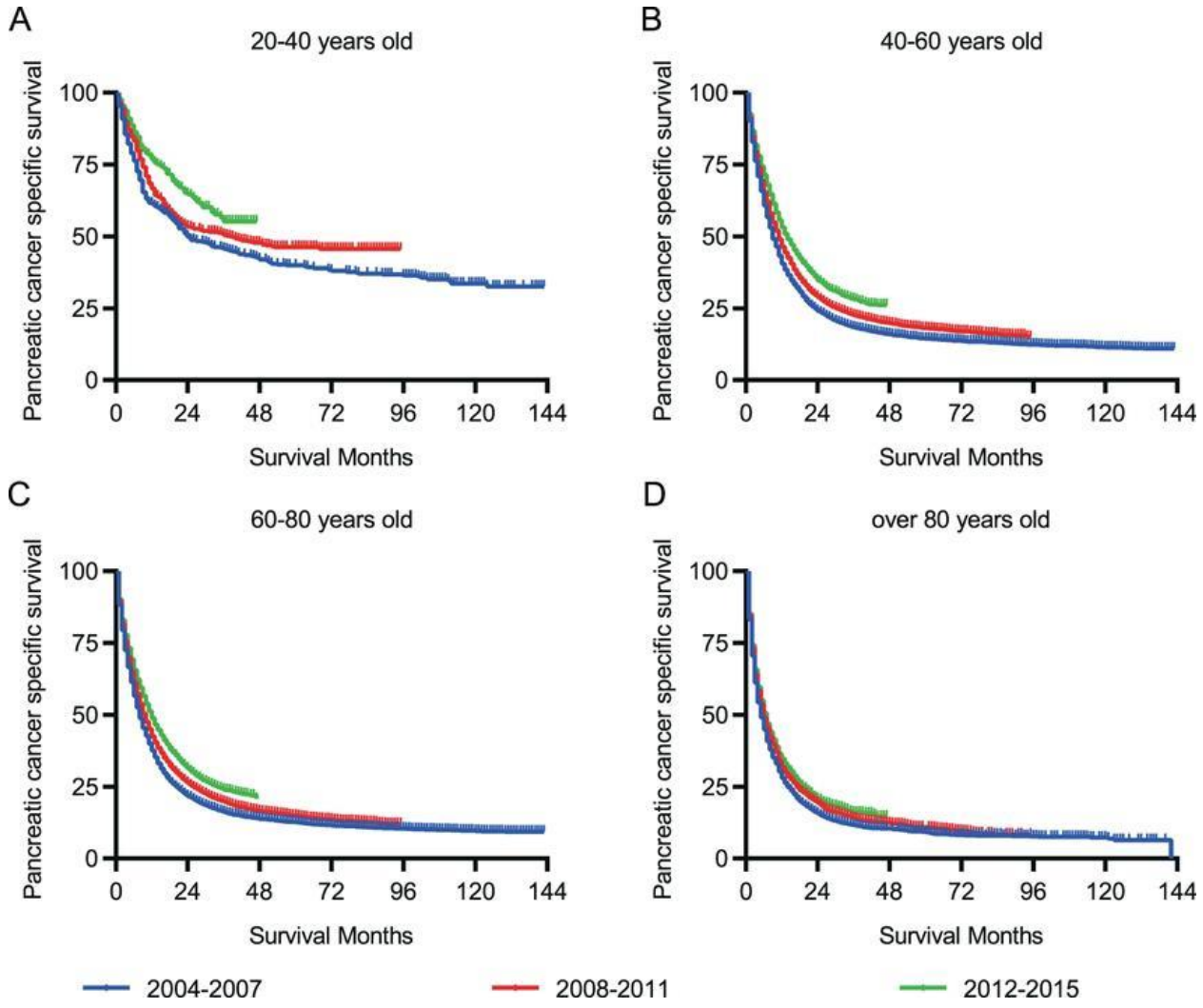
Cancers in the head of the pancreas may cause symptoms earlier and can be more challenging to treat surgically due to their proximity to critical structures. [16]

Tumors in the body or tail may have different presentations and treatment



approaches. It's crucial for individuals with pancreatic cancer to work closely with healthcare professionals to determine the best course of action based on the tumor's location and stage.[1]

17. It's might appear in a suitable curve:[BMC Medicine]



1]The curve would typically start at a relatively low level for younger age groups, such as individuals in their 20s and 30s.

2]The incidence of pancreatic cancer would then gradually rise as people enter their 40s and 50s.

3]The risk of developing pancreatic cancer tends to increase more significantly in the 60s and 70s, reaching its highest levels in older age groups, such as individuals in their 80s and 90s.

4]Beyond a certain age, the curve may start to plateau or decline slightly due to various factors, including a smaller population of individuals in very advanced age groups.

It's important to remember that this is a simplified description, and the actual curve can vary depending on factors such as population demographics,

geographic location, and changes in risk factors over time. Additionally, individual risk factors can play a significant role in pancreatic cancer development, which is why it's crucial for individuals to discuss their specific risk with healthcare providers.

18. Vasoactive intestinal peptide tumor :

This rare islet cell endocrine tumor is marked by secretion of vasoactive intestinal peptide (VIP).Vasoactive intestinal peptide stimulates adenylyl cyclase enzyme that leads to the synthesis of large amounts of CAMP. The cAMP causes increased secretion of potassium and water into the intestinal lumen.[18]

18.1 Clinical Features:

Patient presents with watery diarrhea (5 liters/day), hypokalemia, low levels of chloride in gastric juice (achlorhydria). These symptoms constitute pancreatic cholera.[7][8][9]

19.Multiple Endocrine Neoplasia 1 (MEN 1)

Multiple endocrine neoplasia type 1 is also known as Wermer-Morrison syndrome caused by mutation of the MEN 1 tumor suppressor gene. *Wermer-Morrison syndrome* comprises pituitary Adenoma (acromegaly), parathyroid gland hyperplasia (hypercalcemia) or adenoma and pancreas islet cell Tumors (insulinoma and gastrinoma). Gastrinoma Produces *Zollinger-Ellison syndrome.[2]*

20.CARCINOID TUMORS:

Carcinoid tumors of the pancreas are rare malignant neoplasms that closely resemble intestinal carcinoids. When confined to the pancreas, serotonin, bradykinin, and histamine synthesized from the tumor into venous blood, induce atypical carcinoid syndrome.Hepatic metastases cause the full blown carcinoid Syndrome. Patient presents with severe facial flushing, bron- chial wheezing, watery diarrhea, abdominal colic, hypotension, periorbital edema, and tearing.

20.1 Metastatic Tumors :

Hematogenous Route:Most common malignant tumors of lung, breast, thyroid gland, kidney and melanoma (skin) via hematogenous route reach the pancreas.[14]

Direct Extension:Malignant tumors of stomach, duodenum, colon, kidney, lymph nodes and adrenal glands may spread to pancreas by direct extension.

21. Pancreatic cancer how to prevent :

Preventing pancreatic cancer involves reducing risk factors and adopting a healthy lifestyle. **While there's no guaranteed way to prevent it,** these strategies may help lower your risk:

1]Quit Smoking: Smoking is a significant risk factor for pancreatic cancer. Quitting smoking can reduce your risk over time.[7]

2]Maintain a Healthy Weight: Obesity is associated with an increased risk of pancreatic cancer. Achieving and maintaining a healthy weight through diet and exercise can be beneficial.[2]

3]Limit Alcohol Consumption: Excessive alcohol intake has been linked to pancreatic cancer. If you drink alcohol, do so in moderation.[5]

4]Eat a Balanced Diet: A diet rich in fruits, vegetables, and whole grains may lower your risk. Limit processed foods, red meat, and saturated fats.[18]

5]Control Blood Sugar: Some studies suggest that keeping blood sugar levels in check may reduce the risk of pancreatic cancer. This can be achieved through a balanced diet and regular physical activity.[13]

6]Exercise Regularly: Engaging in regular physical activity can help maintain a healthy weight and may reduce the risk of cancer.[4][6]

7]Manage Chronic Conditions: Certain conditions like diabetes and chronic pancreatitis are associated with an increased risk of pancreatic cancer[18].Manage these conditions under the guidance of a healthcare professional.[7]

8]Limit Exposure to Chemicals: Minimize exposure to harmful chemicals and toxins, such as those in pesticides and industrial environments, which may contribute to cancer risk.[18]

9]Consider Genetic Counseling: If you have a family history of pancreatic cancer or carry genetic mutations like BRCA1 or BRCA2, consider genetic counseling to assess your risk and discuss preventive measures.[12][18]

10]Stay Informed: Stay informed about the latest research and screening guidelines for pancreatic cancer. Early detection can improve treatment outcomes.

Remember that while these steps can help reduce your risk, they cannot guarantee prevention. If you have concerns about pancreatic cancer or specific risk factors, it's essential to consult with a healthcare professional who can provide personalized guidance and screening recommendations.

22. Current updates on the pancreatic cancer :

The American Cancer Society's estimates for pancreatic cancer in the United States for 2023 are: About 64,050 people (33,130 men and 30,920 women) will be diagnosed with pancreatic cancer. About 50,550 people (26,620 men and 23,930 women) will die of pancreatic cancer.[1][5][8][12]

Pancreatic cancer is the eighth most common cancer in women and the tenth most common cancer in men. In both men and women, the number of new cases of pancreatic cancer have gone up by around 1% each year since the late 1990s. Worldwide, an estimated 495,773 people were diagnosed with pancreatic cancer in 2020.

23. Conclusion :

The American Cancer Society's estimates for pancreatic cancer in the United States for 2023 are: About 64,050 people (33,130 men and 30,920 women) will be diagnosed with pancreatic cancer. This rare islet cell endocrine tumor is marked by secretion of vasoactive intestinal peptide (VIP).Vasoactive intestinal peptide stimulates adenylyl cyclase enzyme that leads to the synthesis of large amounts of CAMP. The cAMP causes increased secretion of potassium and water into the intestinal lumen.Symptoms of hypoglycemia as a result of episodic hyperinsulinemia include hunger, sweating, irritability, epileptic seizures, and coma.Pancreatic carcinoma is a genetic disease of inherited or acquired gene mutations. Glands are organs that produce and release substances in the body. The pancreas performs two main functions: Exocrine function: Produces substances (enzymes) that help with digestion.

24. Reference :

1] A Jemal , Bray F, Center MM, et al. Global cancer statistics. CA Cancer J Clin 2011;61:69–90.

2] Amin Khameneh, Leila Vahedi Tooraj Asvadi Mohammad AsghariJafarabadi, Survival and prognostic factors among hospitalized pancreatic cancer patients in northwestern Iran Jan 2023.

3] Atkins D, Best D, Briss PA, et al. Grading quality of evidence and strength of Recommendations. BMJ 2004;328:1490–4.

4] Al-Sukhni W, Borgida A, Rothenmund H, et al. Screening for Pancreatic Cancer in A High-Risk Cohort: An Eight-Year Experience. J Gastrointest Surg 2011;16:771–83.

5] Brentnall TA. Pancreatic cancer surveillance: learning as we go. Am J Gastroenterol 2011;106:955-6.

6] Bland M. An Introduction to Medical Statistics. Oxford:Oxford Medical Publications; 1987. P. 241-65.

7] Byung Kyu Park Jeong Hun Seo Joung-Ho Han Jung Kyu Choi, Trends in treatment patterns and survival outcomes in pancreatic cancer: A nationwide population-based study.jun2023.

8] Faivre J, Forman D, Estève J, Obradovic M, San M and The EUROCARE Working Group. Survival of patients With primary liver cancer, pancreatic cancer and biliary Tract cancer in Europe. Eur J Cancer. 1998;34:2184-90

9] Brune KA, Lau B, Palmisano E, et al. Importance of age of onset in pancreatic Cancer kindreds. J Natl Cancer Inst 2010;102:119–26.

10] Brugge WR, Lewandrowski K, Lee-Lewandrowski E, et al. Diagnosis of pancreatic Cystic neoplasms: a report of the cooperative pancreatic cyst study. Gastroenterology 2004;126:1330–6.

11] Caitlin A. Hester,Matthew H Katz A patient-centered, multidisciplinary approach to treating borderline resectable pancreatic adenocarcinoma.

12] Canto MI, Goggins M, Hruban RH, et al. Screening for early pancreatic neoplasia in High-risk individuals: a prospective controlled study. Clin Gastroenterol Hepatol 2006;4:766–81; quiz 665.

13] Jacobs EJ, Chanock SJ, Fuchs CS, et al. Family history of cancer and risk of Pancreatic cancer: a pooled analysis from the Pancreatic Cancer Cohort Consortium (PanScan). Int J Cancer 2010;127:1421–8.

14] Grover S, Syngal S. Hereditary Pancreatic Cancer Gastroenterology2010;139:1076–80.

15] Harinck F, Konings IC, Kluijt I, et al: A multi-Centre comparative prospective blinded analysis of EUS and MRI for screening of pancreatic cancer in High-risk individuals. Gut pii:gutjnl-2014-308008, 2015

16] Helen Binang,Chamini Jayamali Perera Minoti V.Apte Role of Pancreatic Tumour-Derived Exosomes and Their Cargo in Pancreatic Cancer-Related Diabetes.

17] Vasen HF, Wasser M, van Mil A, et al: Magnetic resonance imaging surveillance detects Early-stage pancreatic cancer in carriers of a P16-Leiden mutation. Gastroenterology 140:850-856, 2011.

18] Vinay Kamal Director Professor of Pathology Maulana Azad Medical College Bahadur Shah Zafar Marg New Delhi (India) Editors -Anubhav MD Vigyat MD Illustrations by Ram Murti Senior Graphic Artist and Volume I contains: General Pathology, Hematology including Recent Diagnostic Techniques Volume II contains: Systemic Pathology.

*** THANK YOU ***