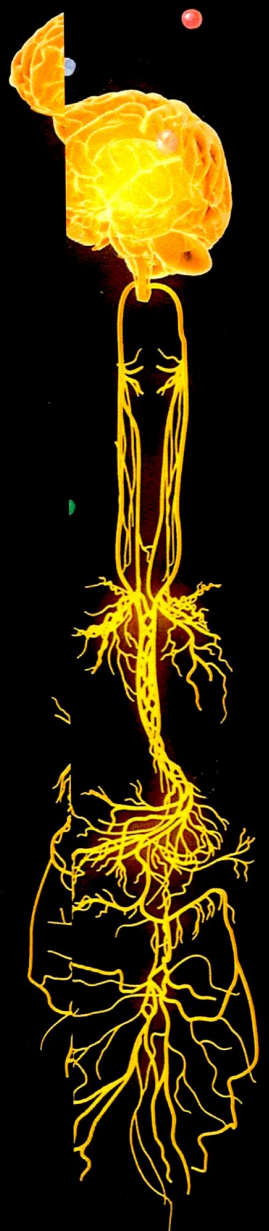
Medical



GROUP
NEET SS

Volume 5
2nd Edition

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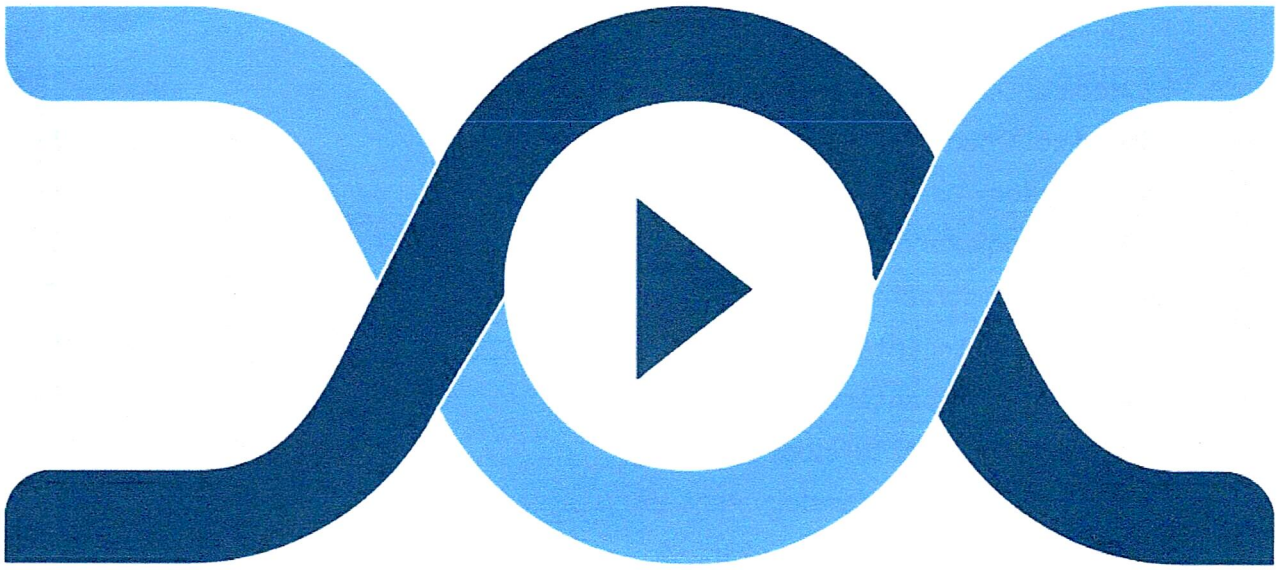
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MEDICAL ONCOLOGY PART -1

Tumor markers 00:00:55

Tumor Markers		
Tumor markers	**Cancer**	**Nonneoplastic Conditions**
Hormones		
Human chorionic gonadotropin	Gestational trophoblastic disease, gonadal germ cell tumor	Pregnancy
Calcitonin	Medullary cancer of the thyroid	
Catecholamines	Pheochromocytoma	
Oncofetal Antigens		
α Fetoprotein	Hepatocellular carcinoma, gonadal germ cell tumor	Cirrhosis, hepatitis
Carcinoembryonic antigen	Adenocarcinomas of the colon, pancreas, lung, breast, ovary	Pancreatitis, hepatitis, inflammatory bowel disease, smoking
Enzymes		
Prostatic acid phosphatase	Prostate cancer	Prostatitis, prostatic hypertrophy
Neuron-specific enolase	Small-cell cancer of the lung, neuroblastoma	
Lactate dehydrogenase	Lymphoma, Ewing's sarcoma	Hepatitis, hemolytic anemia, many others

- Measured in serum
- Associated with tumors
- Helpful in
  1. Diagnosis
  2. Treatment- monitoring
  3. Recurrence
  4. Drug will be useful or not
  5. Cancer will be aggressive or not
- Prognosis
  1. Predictive markers
  2. Prognostic markers
- HCG level remains increased after abortion for a longer time — suspect gestational trophoblastic dx
- Hepatocellular carcinoma: AFP levels, imaging

- AFP used in: germ cell tumors having yolk sac component, single component, mixed germ cell tumors
- CEA used most commonly for colon cancer but not specific
- Monitoring
- High CEA in smokers
- Neuron-specific enolase: not used nowadays
- LDH: non-specific
- LDH: diagnostic, staging marker for germ cell tumors

Tumor-associated proteins

Tumor-Associated Proteins		
Prostate-specific antigen	Prostate cancer	Prostatitis, prostatic hypertrophy
Monoclonal immunoglobulin	Myeloma	Infection, MGUS
CA-125	Ovarian cancer, some lymphomas	Menstruation, peritonitis, pregnancy
CA19-9	Colon, pancreatic, breast cancer	Pancreatitis, ulcerative colitis
CD30	Hodgkin's disease, anaplastic large-cell lymphoma	
CD25	Hairy cell leukemia, adult T-cell leukemia/ lymphoma	Hemophagocytic lymphohistiocytosis

- CA-125: non-specific
- Can increase in peritonitis, peritoneal cancer
- Increases in menstruation, pregnancy
- CD30: classical marker of Hodgkin's dx
- Used rarely now
- Surface antigen
- Marker

Screening of Cancer – 00:11:05

1. Breast
   - Self-examination, clinical examination, tomosynthesis: currently not recommended
   - Mammography, MRI: recommended
   - ACS: American Cancer Society
   - USPSTF

- Start screening: 40/45 years
- No cut off age to stop screening
- Modalities to find out life-time risk of breast cancer

Screening Recommendations for Asymptomatic Subjects Not Known to Be at Increased Risk for the Target Condition			
Cancer Type	est for procedure	USPSTF	Acs
Breast	Self-examination	"D" (Not in current recommendations; from 2009)	Women, all ages: No specific recommendation
	Clinical examination	Women ≥40 years: "I" (as a stand-alone without mammography) (Not in current recommendations; from 2009)	Women, all ages: Do not recommend
	Mammography	Women 40-49 years: The decision to start screening mammography in women prior to age 50 years should be an individual one. Women who place a higher value on the potential benefit than the potential harms may choose to begin biennial screening between the ages of 40 and 49 years. (C) Women 50-74 years: Every 2 years ("B") Women ≥75 years. "I"	Women 40-44 years: Provide the opportunity to begin annual screening Women 45-54 years: Screen annually Women ≥55 years: Transition to biennial screening or have the opportunity to continue annual screening Women ≥40 should continue screening mammography as long as their overall health is good and they have a life expectancy of 10 years or longer
	Magnetic resonance imaging (MRI)	"I" (Not in current recommendations, from 2009)	Women with >20% lifetime risk of breast cancer: Screen with MRI plus mammography annually Women with 15-20% lifetime risk of breast cancer. Discuss option of MRI plus mammography annually Women with <15% lifetime risk of breast cancer: Do not screen, annually with MRI
	Tomosynthesis	Women, all ages: "I"	No specific recommendation

2. Colorectal

Colorectal	Overall	Adults 50–75 years: "A" Screen for colorectal cancer; the risks and benefits of the different screening methods vary Adults 76–85 years: "C" The decision to screen should be an individual one, taking into account the patient's overall health and prior screening history	Adults ≥45–75 years: Screen for colorectal cancer with either a high-sensitivity stool-based test or a structural (visual) examination (≥45 years, qualified recommendation; ≥50 years, strong recommendation) Adults 76–85 years: Individualize screening based on patient preferences, life expectancy, health status, and prior screening history (qualified recommendation) Adults >85 years: Discourage screening (qualified recommendation) Every 5 years
	Sigmoidoscopy	Every 5 years; modelling suggests improved benefit if performed every 10 years in combination with annual FIT	Adults ≥45 years: Every 5 years
	Fecal occult blood testing (FOBT)	Every year	Adults ≥45 years: Every year
	Colonoscopy	Every 10 years	Adults ≥45 years: Every 10 years
	Fecal DNA testing	At least every 3 years	Adults ≥45 years: Every 3 years
	Fecal immunochemical testing (FIT)	Every year	Adults ≥45 years: Every year
	Computed tomography (CT) colonography	Every 5 years	Adults ≥45 years: Every 5 years

3. Cervical

- <21 yrs: no screening
- 21–29 yrs: only Pap smear (every 3 years)
- 30–65 yrs: co-testing-HPV+ papsmear (every 5 years) or Pap smear only (every 3 years)
- After 65 yrs: no screening if prior screenings are negative

Cervical	Pap test (cytology)	Women <21 years: "D" Women 21-29 years: Screen with cytology alone every 3 years ("A") Women 30-65 years: Screen with cytology alone every 3 years, or with co-testing (HPV testing + cytology) every 5 years (two of three options, see HPV test below) ("A") Women >65 years, with adequate, normal prior Pap screenings: "D" Women after total hysterectomy for noncancerous causes. "D"	Women <21 years. No screening Women 21-29 years: Screen every 3 years Woman 30-65 years: Screen with co-testing (HPV testing + cytology) every 5 years or cytology alone every 3 years (see HPV test below) Women >65 years: No screening following adequate negative prior screening Women after total hysterectomy for noncancerous causes. Do not screen
	HPV test	Women <30 years: Do not use HPV testing for cervical cancer screening Women 30-65 years: Screen with HPV testing alone or in combination with cytology every 5 years (two of three options, see Pap test above) ("A") Women >65 years, with adequate, normal prior Pap screenings. "D" Women after total hysterectomy for	Woman <30 years: Do not use HPV testing for cervical cancer screening Women 30-65 years: Preferred approach to screen with HPV and cytology co-testing every 5 years (see Pap test above) Women >65 years: No screening following adequate negative prior screening Women after total hysterectomy for

Screening Recommendations for Asymptomatic Subjects Not Known to Be at Increased Risk for the Target Condition[a] (Continued)

Cancer type	Test or procedure	USPSTF	ACS
Lung	Low-dose CT scan	Adults 55-80 years, with a ≥30 pack-year smoking history, still smoking or have quit within past 15 years: "B" Discontinue once a person has not smoked for 15 years or develops a health problem that substantially limits life expectancy or the ability to have curative lung surgery	Men and women, 55-74 years, with ≥30 pack-year smoking history, still smoking or have quit within past 15 years: Discuss benefits, limitations, and potential harms of screening, offer smoking cessation counselling where relevant, only perform screening in high-volume, high-quality lung cancer screening and treatment centers.

Ovarian	CA-125 Transvaginal ultrasound	Women, all ages: "D" Women with a high-risk hereditary cancer syndrome: No recommendation	Currently, there are no reliable screening tests for the early detection of ovarian cancer. For women at high risk of ovarian cancer, it has not been proven that using transvaginal ultrasound or serum CA-125 lowers their chances of dying from ovarian cancer
Prostate	Prostate-specific antigen (PSA)	Men 55-69 years: The decision to undergo periodic PSA-based screening should be an individual one. Men should have an opportunity to discuss the potential benefits and harms of screening with their clinician. Clinicians should not screen men who do not express a preference for screening ("C") Men ≥70 years: "D"	Starting at age 50, men at average risk and with a life expectancy of ≥10 years should talk to a doctor about the uncertainties, risks, and potential benefits of screening. If African American or have a father or brother who had prostate cancer before age 65, men should have this talk starting at age 45. For men with more than one first-degree relative with prostate cancer diagnosed before age 65, have this talk starting at age 40. How often they are screened will depend on their PSA level
	Digital rectal examination (DRE)	No individual recommendation	As for PSA; if men decide to be tested, they should have the PSA blood test with or without a rectal exam
Skin	Complete skin examination by clinician or patient	Adults, all ages: "I"	No guidelines

4. Lung
   - Low-dose CT scan only in high-risk population
5. Ovarian
   - No reliable screening tests for early detection
6. Prostate
   - Periodic PSA-based screening
   - Individualized
   - Not mandatory
7. Skin
   - Skin examination - not relevant now

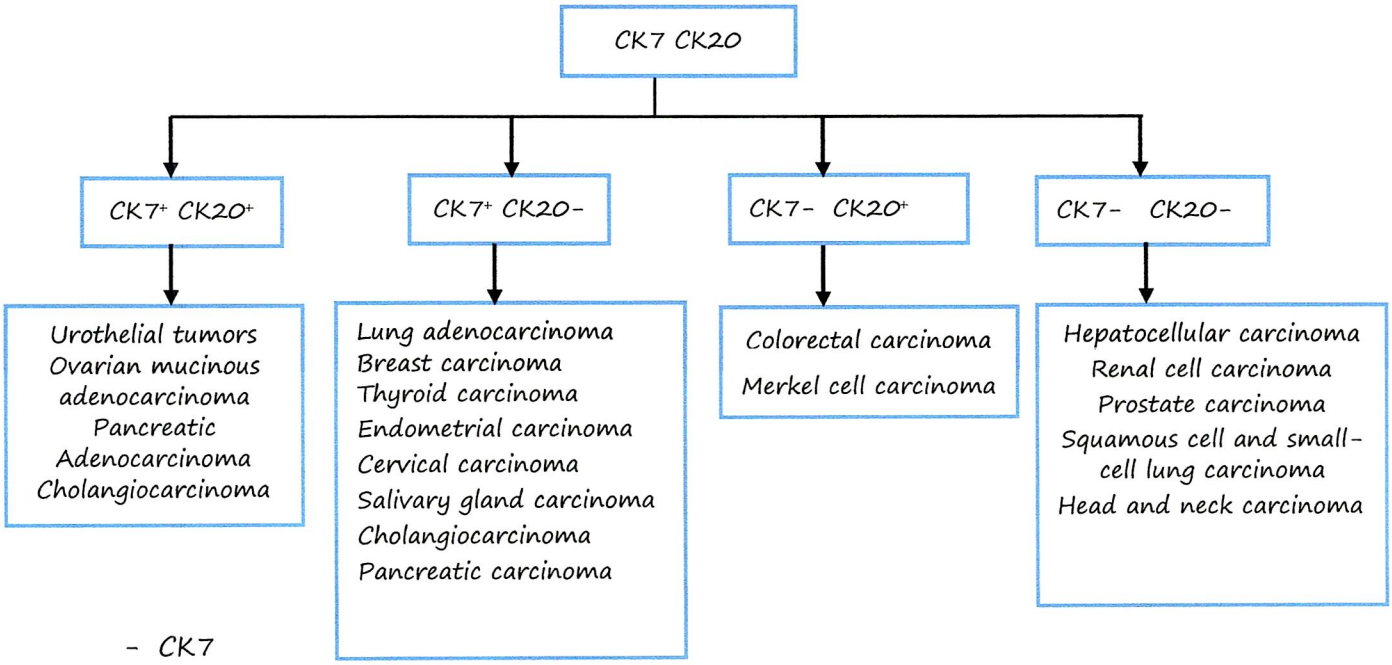
Select Immunohistochemical Stains Useful in the Diagnosis of CUP	
Likely primary profile	Commonly considered IHC to assist in differential diagnosis of cupa
Breast	ER, GCDFP-15, mammaglobin, HER2/neu, GATA3
Ovarian/mullerian	ER, WT1, CK7, PAX8, PAX2
Lung adenocarcinoma	TTF-1; nuclear staining, napsin A, SP-A1
Germ cell	B-hCG, AFP, OCT3/4, CKIT, CD30 (embryonal), SALL4
Prostate	PSA, α-methylacyl CoA racemase/P504S (AMACR/P504S), P501S (prostein), PSMA, NKX3-1
Intestinal	CK7, CK20, CDX-2, CEA
Neuroendocrine	Chromogranin, synaptophysin, CD56
Sarcoma	Desmin (desmoid tumors), factor VIII (angiosarcomas), CD31, smooth muscle actin (leiomyosarcoma), MyoD1 (rhabdomyosarcoma)
Renal	RCC, CD10, PAX8, CD10
Hepatocellular carcinoma	Hep Par-1, Arg-1, glypican-3
Melanoma	S100, SOX-10, vimentin, HMB-45, tyrosinase, melan-A
Urothelial	CK7, CK20, thrombomodulin, uroplakin III
Mesothelioma	Calretinin, WT1, D2-40, mesothelin

- Most common cancer which present as unknown primary is adenocarcinoma
- Biopsy - to understand whether it is cancer or not
- Imaging modalities not showing any primary

1. Breast
   - Most common
   - No findings in CT scan, mammogram
   - Nothing palpated clinically
   - Estrogen receptors CER: not specific
   - GCDFP-15
   - Mammaglobin
   - HER2/ nee
   - GATA3
2. Ovarian/Mullerian
   - WTI
   - PAX8

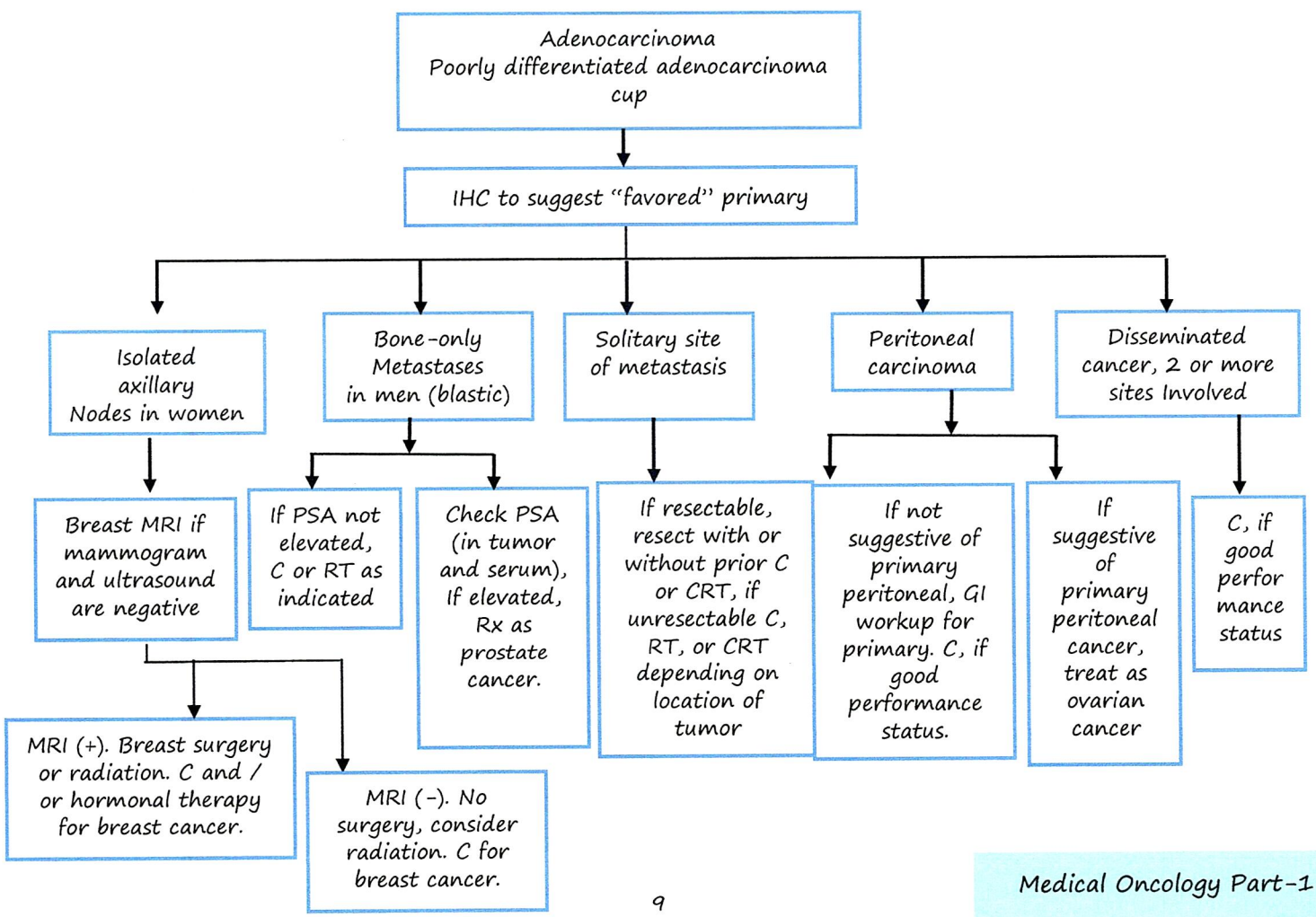
- CA-125

3. Lung adenocarcinoma
   - TTF-1
   - Napsin-A 1
4. Germ cell
   - SALL4 - pan germ cell tumor marker
   - CD30- embryonal
5. Prostate
   - PSA
6. Intestinal
   - CDX-2
   - CEA
7. Neuroendocrine
   - Chromogranin
   - Synaptophysin
   - CD56
8. Sarcoma
   - Factor VIII - Angiosacromas
   - MyoD1 -Rhabdomyosarcoma
9. Renal
   - CD10 - usually seen in Leukemias
10. Hepatocellular carcinoma
    - Non-specific
11. Melanoma
    - S100
    - Melan-A
12. Lymphoma
    - LCA (Leukocyte Common Antigen)
    - CD3
    - CD4
    - CD5
    - CD20
    - CD45
    - T, B-cells
13. SCC (squamous cell carcinoma)
    - P63
    - P40 (lung SCC)
    - CK5/6



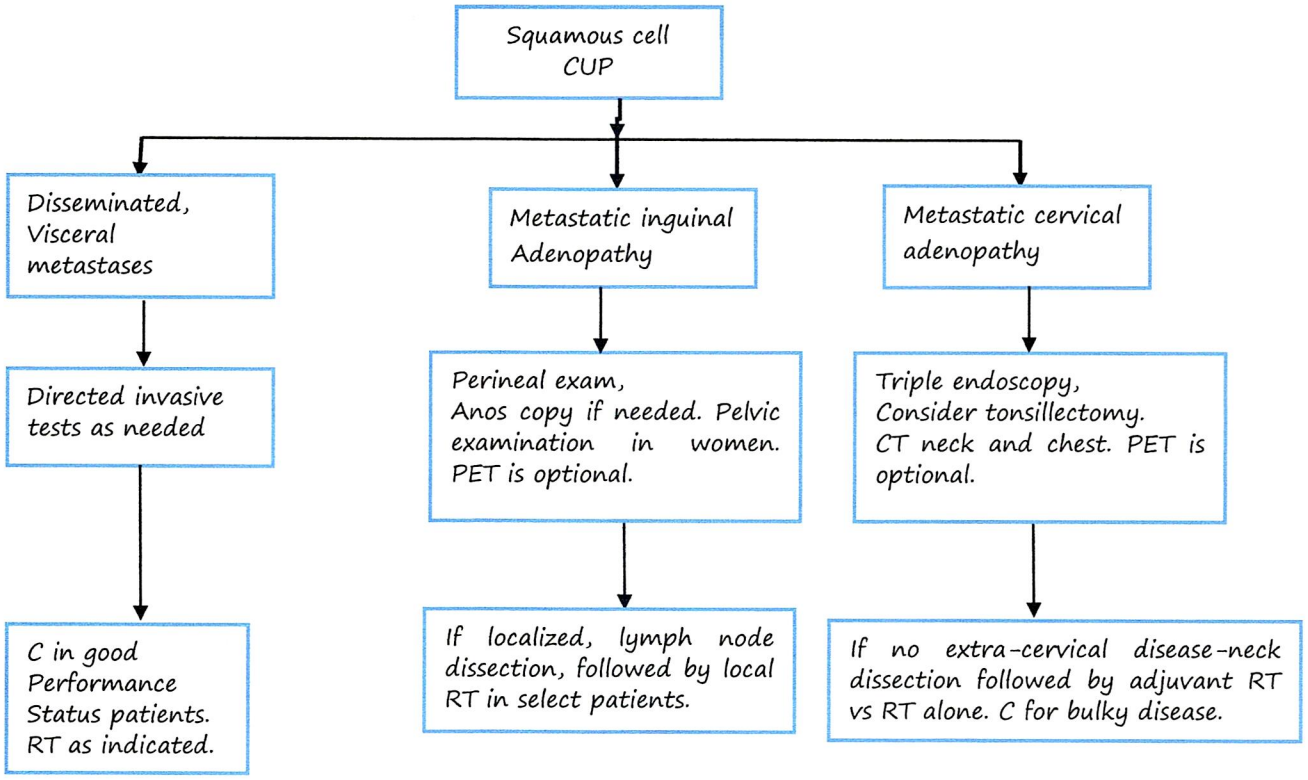
- CK7
- CK20
- Will tell us which are is the primary area (based on their positivity)
- CK7+ CK20+ —below diaphragm
- CK7- CK20- — above and below diaphragm

Treatment algorithm for adenocarcinoma and poorly differentiated adenocarcinoma of unknown primary (CUP)



Treatment algorithm for adenocarcinoma and poorly differentiated adenocarcinoma of unknown primary (CUP), C, chemotherapy, CRT, chemoradiation, GI, gastrointestinal, IHC immunohistochemistry, MRI, magnetic resonance imaging: PSA, prostate-specific antigen, RT, radiation.

Treatment algorithm for squamous cell carcinoma of unknown primary (CUP)



Treatment algorithm for squamous cell carcinoma of unknown primary (CUP). C, chemotherapy, CT, computed tomography, PET, positron emission tomography, RT, radiation.

MEDICAL ONCOLOGY PART-2

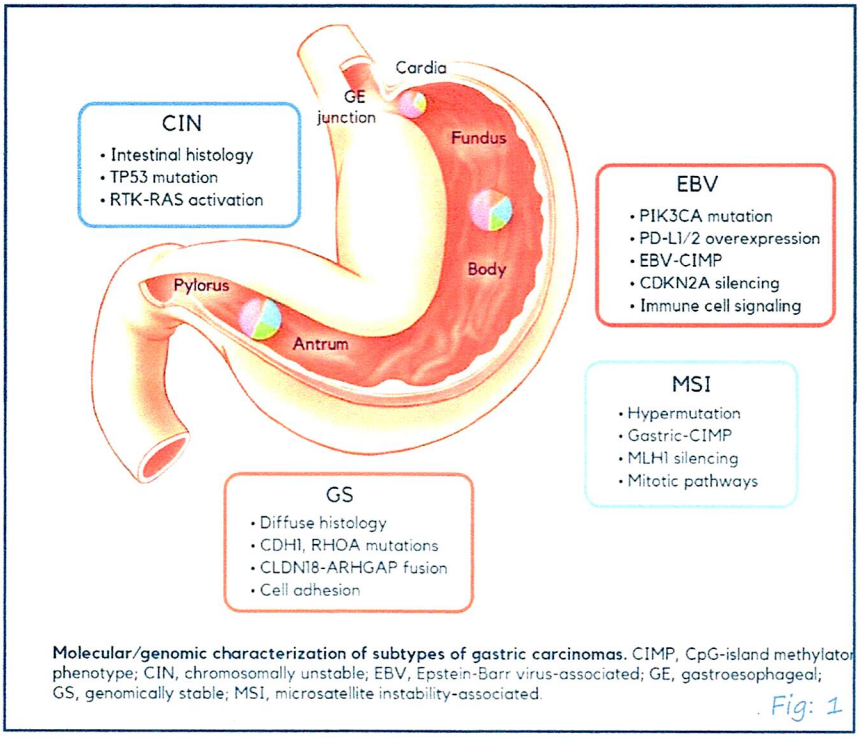
- Some etiologic factors associated with squamous cell cancer of the esophagus

Some Etiologic Factors Associated with Squamous Cell Cancer of the Esophagus
Excess alcohol consumption
Cigarette smoking
Other ingested carcinogens
Nitrates (converted to nitrites)
Smoked opiates
Fungal toxins in pickled vegetables
Mucosal damage from physical agents
Hot tea
Lye ingestion
Radiation-induced strictures
Chronic achalasia
Host susceptibility
Esophageal web with glossitis and iron deficiency (i.e., Plummer-Vinson or Paterson-Kelly syndrome)
Congenital hyperkeratosis and pitting of the palms and soles (i.e., tylosis palmaris et plantaris)
? Dietary deficiencies of selenium, molybdenum, zinc, and vitamin A

  - Ca esophagus a type of histology of cancer seen:
    1. Squamous cell carcinoma - upper 1/3rd, middle 1/3rd, lower 1/3rd
    2. Adenocarcinoma - lower 1/3rd
  - Different etiological factors
  - Similar treatment
- Some etiologic factors associated with adenocarcinoma of the esophagus

Some Etiologic Factors Associated with Adenocarcinoma of the Esophagus
Chronic gastroesophageal reflux
Obesity
Barrett's esophagus
Male sex
Cigarette smoking

  - All causes are interconnected
- Molecular/genome characterization of subtypes of gastric carcinomas 00:05:00



Molecular/genomic characterization of subtypes of gastric carcinomas. CIMP, CpG-island methylator phenotype; CIN, chromosomally unstable; EBV, Epstein-Barr virus-associated; GE, gastroesophageal; GS, genomically stable; MSI, microsatellite instability-associated.

Fig: 1

- Understand prognosis
- Etiological factors
- Possible treatment changes
- 4 subtypes
- EBV causes:
  1. Lymphomas
  2. Nasopharyngeal carcinoma
  3. Gastric carcinoma
- Most common - CIN
- Good prognosis - EBV
- Therapeutic options for – MSI

Risk factors for the development of Colorectal cancer 00:06:56

Risk Factors for the Development of Colorectal Cancer
Diet: Animal fat, obesity
Hereditary syndromes
Polyposis coli
MYH-associated polyposis
Nonpolyposis syndrome (Lynch's syndrome)
Inflammatory bowel disease
Streptococcus bovis bacteremia
Tobacco use

- Dietary issues: main factor, predisposing
- Crohn's disease might evolve into a carcinoma

- Ulcerative colitis associated (rare)

- Heritable (autosomal dominant) gastrointestinal neoplasia syndrome

Heritable (Autosomal Dominant) Gastrointestinal Neoplasia Syndromes				
SYNDROME	DISTRIBUTION OF POLYPS	HISTOLOGIC TYPE	MALIGNANT POTENTIAL	ASSOCIATED LESIONS
Familial adenomatous polyposis	Large intestine	Adenoma	Common	None
Gardner's syndrome	Large and small intestines	Adenoma	Common	Osteomas, fibromas, lipomas, epidermoid cysts, ampullary cancers, congenital hypertrophy of retinal pigment epithelium
Turcot's syndrome	Large intestine	Adenoma	Common	Brain tumors
MYH-associated polyposis	Large intestine	Adenoma	Common	None
Lynch syndrome (nonpolyposis syndrome)	Large intestine (often proximal)	Adenoma	Common	Endometrial and ovarian tumors (most frequently), gastric, genitourinary, pancreatic, biliary cancers (less frequently)
Peutz-Jeghers syndrome	Small and large intestines, stomach	Hamartoma	Rare	Mucocutaneous pigmentation; tumors of the ovary, breast, pancreas, endometrium
Juvenile polyposis	Large and small intestines, stomach	Hamartoma, rarely progressing to adenoma	Rare	Various congenital abnormalities

- Peutz-Jeghers syndrome:
- mucosal + GI lesions
- colon cancer predisposing Hamartoma
- Hamartoma turning into cancer: rare

Screening in Colon cancer:

Colorectal	Overall	Adults 50-75 years: "A" Screen for colorectal cancer, the risks and benefits of the different screening methods vary Adults 76-85 years: "C" The decision to screen should be an individual one, taking into account the patient's overall health and prior screening history	Adults ≥45-75 years: Screen for colorectal cancer with either a high-sensitivity stool-based test or a structural (visual) examination (≥45 years, qualified recommendation; ≥50 years, strong recommendation). Adults 76-85 years: Individualize screening based on patient preferences, life expectancy, health status, and prior screening history (qualified recommendation). Adults >85 years: Discourage screening (qualified recommendation). Every 5 years
	Sigmoidoscopy	Every 5 years, modeling suggests improved benefit if performed every 10 years in combination with annual FIT	Adults ≥45 years: Every 5 years
	Fecal occult blood testing (FOBT)	Every year	Adults ≥45 years: Every year
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	Fecal DNA testing	At least every 3 years	Adults ≥45 years: Every 3 years
	Fecal immunochemical testing (FIT)	Every year	Adults ≥45 years: Every year
	Computed tomography (CT) colonography	Every 5 years	Adults ≥45 years: Every 5 years

- Screening in colon cancer:
  1. Start at 45-50 years
  2. Stop at 75-85years benefit is less than that in order age groups
- Imaging:
  1. Sigmoidoscopy
  2. Colonoscopy
  3. CT colonography
- Stool sample based:
  1. Fecal occult blood testing (FOBT)
  2. Fecal DNA testing
  3. Fecal immunochemical testing (FIT)