Cancer – I & II

(Cancer – Epidemiology, Oral & Lung Ca., Breast & Cervical Ca., NCCP & NCRP)

Definition

- A group of diseases characterized by…

i) an abnormal growth of cells,

ii) ability to invade adjacent tissues & even distant organs and

iii) the eventual death of the affected patient if the tumor has progressed beyond that stage when it can be successfully removed.

Categories

- Carcinoma- Epithelial cells

- Sarcoma- Mesodermal cells

- Lymphoma, Myeloma, Leukemia- Bone marrow and Immune System

- Tumor-
  - Primary-Organ of origin
  - Secondary- Regional lymph nodes and distal organs

Problem statement (Global)

- 10 million people are diagnosed with cancer & more than 6 million die of the diseases every year.

- About 22.4 million persons were living with cancer in the year 2000.

- **Most common cancers (world) -**
  - lung cancer (12.3%)
  - breast cancer(10.4%) &
  - colorectal cancer(9.4%)

Problem statement (India)

- **Prevalence – 2 to 2.5 million cases**

- **Incidence – 7,00,000 to 9,00,000 new cases every year**

- **Cases detected in advanced stage – 2/3ʳᵈ of incidence**

- **Deaths due to cancer – 3,00,000 to 3,50,000 every year**

Incidence rates

- **Age – standardized incidence rate**

  (per 1,00,000 population, world std.)

  - Male – female variation
  - Urban – rural variation
  - Developing – developed variation

- **Crude incidence rate**

  (per 1,00,000 population, geographic area, year)

- **Truncated age – adjusted incidence rate (TR)**

  (for 35-64 years of age)

Common Ca. in India

Common Ca. in Males	Common Ca. in Females
Mouth / Oropharynx	Cervix
Oesophagus	Breast
Stomach	Mouth / Oropharynx
Lower Respi. Tract (Trachea, Bronchi, Lungs)	Oesophagus

Ca. Cervix + Ca. Breast = 60% all Ca. in females

Early detection & Mx in Stage I or State A & 5 years survival rates

Cancer	Survival Rate
Ca. Breast	75%
Ca. Cervix	**90%**
Ca. Vocal Cords	**90%**
Ca. Rectum	85%

Etiology

- **(Agent-Host-Environment factors)**
- **3 Intakes**
  - **Tobacco** *(Mouth, URT, LRT, Kidney, Bladder, Pancreas)*
  - **Alcohol** *(Oesophagus, Rectum, Liver)*
  - **Diet** *(Smoked fish – stomach, fiber lack - colon)*
- **3 Exposures**
  - **Occupation** *(Benzene, As, Cd, Cr, Vinyl Cl, Asbestoses, polycyclic hydrocarbon)*
  - **Parasite** *(Schistosomiasis)*
  - **Virus** *(HIV, HPV, EBV, HBV)*
- **3 conditions**
  - **Genetic** *(Mongols, Retinoblastoma)*
  - **Environment** *(Sunlight, Radiation, Pollution)*
  - **Life style** *(Chimney, Sedentary life-style)*

Agent (Physical)

- Physical
  - Heat
  - Solar radiation

- Ionizing radiation

- Friction

- Cancers
  - Kangri and chutta
  - Basal Cell Carcinoma

- Leukemia

Agent (Chemical)

- Chemical
  - Aniline dye
  - Asbestose
  - Benzole
  - Nickel, Chromates, 3-4 benzpyrine

- Cancer
  - Bladder
  - Pleural mesothelioma
  - Leukemia
  - Other Lung Ca.

Agent (Chemical)

- Medications (e.g. oestrogen)
- Pesticides…

Agent (Biological)

- Biological
  - Hepatitis B
  - CMV
  - EB

  - HPV
  - HTLV
  - Schistosomia Haematobium

- Cancer
  - Hepatocellular
  - Kaposi's sarcoma
  - Berkitt's lymphoma and Nasopharyngeal Ca.
  - Cervix
  - T Cell lymphoma
  - Ca. Bladder

Agent (Factors)

- Nutrition
  - Smoked fish
  - Beef
  - **High fat intake**

  - Less fiber

- Cancer
  - Stomach
  - Bowel
  - **Breast**

- Colon& Colorectal

Host factors

1. Age
2. Sex
3. Ethnicity
4. Residence
5. Occupation
6. Personal habits
7. Dietary patterns
8. Occupational and Environmental condition play a major role rather than genetic factors
9. "Stress": Initial diagnosis often perceived by patients as life threatening, profoundly distressing, economically disruptive diagnosis

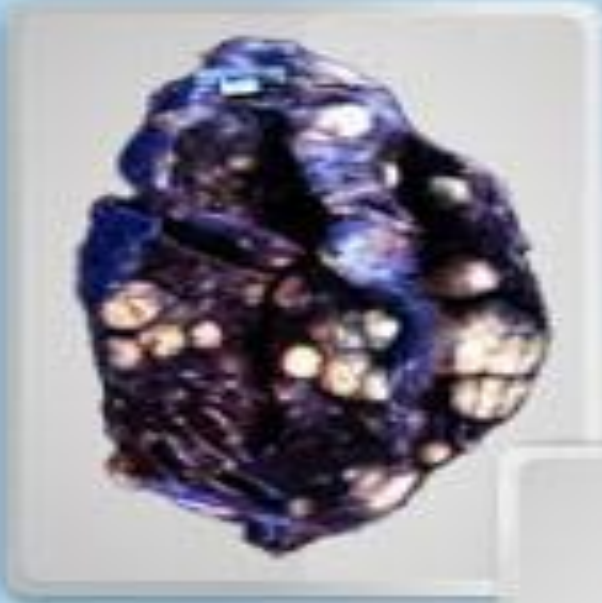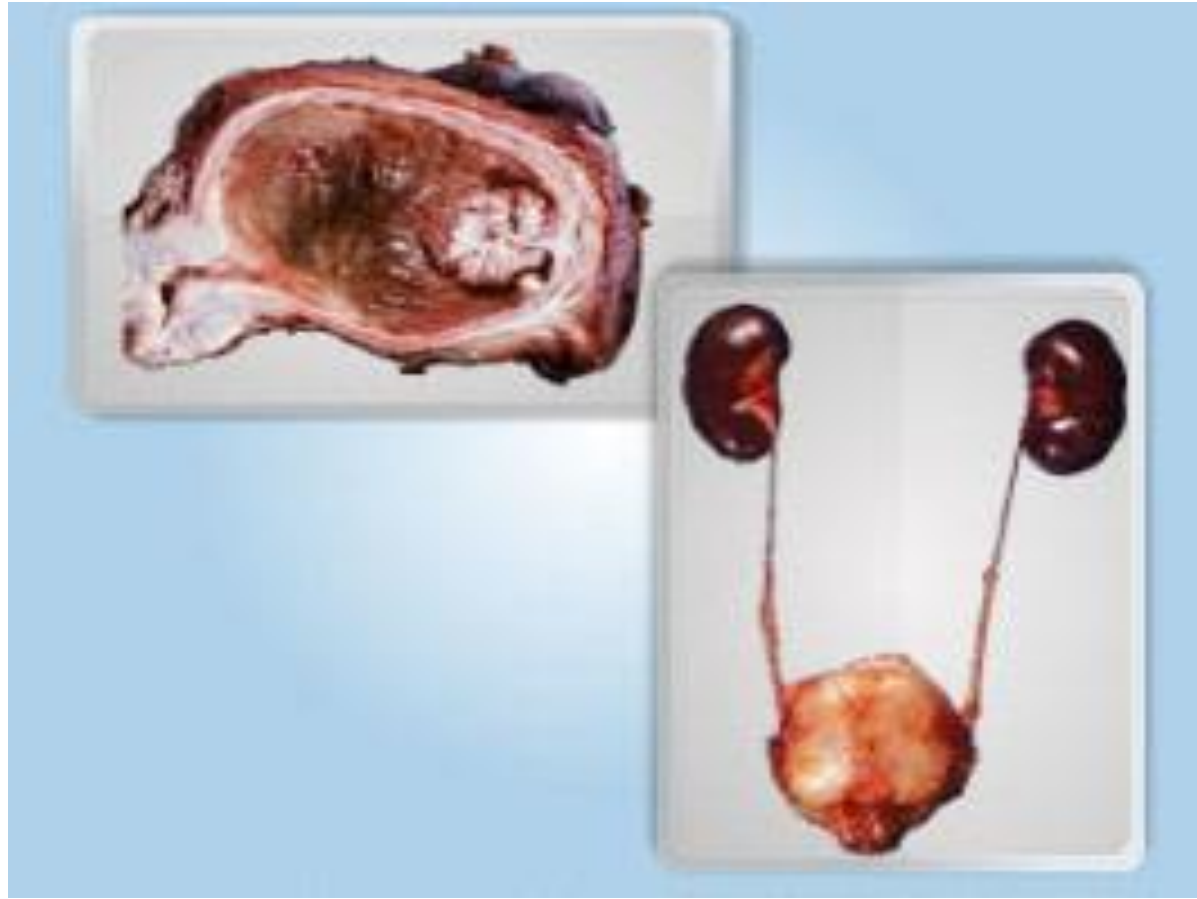**Smoking Damages** nearly **Every Organ** in the Human **Body**

In the world as a whole, cigarette smoking is now responsible for

more than one million premature deaths

each year……

Warning signs of Cancer

1. Persistent / non-healing ulcer
2. White / red raised patch and/or lump/growth in mouth
3. Restriction in mouth opening
4. Difficulty in chewing / swallowing
5. Persistent cough or hoarseness of voice and/or nagging cough
   Change in wart or mole
6. Persistent change in digestive & bowel habits
7. Persistent jaundice + loss of wt.
8. A lump or hard area in breast / body
9. Excessive loss of blood at monthly period or loss of blood outside the usual dates p/v
10. Blood loss from any orifice
11. Unexplained loss of weight or PUO

CANCER CONTROL

- **1. PRIMARY PREVENTION: -**

  - *Refer Etiology*

  - **TREATMENT OF PRE- CANCEROUS LESIONS**: - early detection & prompt treatment of cervical tears, intestinal polyposis, warts, chronic gastritis, cervicitis etc.

  - **LEGISLATION**: - legislation to control environmental carcinogen. But inadequately or moderately enforced

  - **CANCER EDUCATION (HE)**: -
    - Directed at high-risk group.
    - Aim is to motivate people to seek early diagnosis & early treatment.

- Conducting drawing and essay competitions -School Children

- Debates, discussions, seminars and street play competitions Youth and University students.

- Participatory workshops and training sessions. NGO groups, Municipal, District and State Health Administration

- Structured training and field activities - Medical Colleges

- Participatory programmes on radio and television - Mass Media.

- Descriptive articles in newspapers and magazines - Mass Media.

- Exhibitions and public lectures - General Population

- **2. SECONDARY PREVENTION:**

i) Cancer registration: - provide a base for assessing the magnitude of the problem & for planning the necessary services

Cancer registries: - two types

Hospital based registries: - all patients treated by a particular institution- useful for evaluation of diagnostic & treatment programme.

Population based registries: - a right step is to establish hospital based cancer registries & extend the same to a population based registries.

- Aim is to cover the complete cancer situation in a given geographic area.

ii) **Early detection of cases**:

Cancer screening – main weapon for in-situ or pre-malignant lesion with main focus on high-risk group

iii) **Treatment**:

Surgical removal, radiation or chemotherapy.

Freedom from cancer pain is now considered a 'right for cancer patients'.

CANCER SCREENING

- Search for unrecognized malignancy by means of rapidly applied tests

- *Cancer screening is possible because:*
  - In many cases, malignant ds. is preceded for a period of months or years by a pre-malignant lesion, removal of which prevents subsequent development of cancer
  - Most cancer begin as localized lesion & **if found at this stage**, a high cure rate can be obtained
  - 75% of all cancers occur in body sites that are accessible.
  - **30% of all Ca. Curable, 40% preventable, rest 30% = palliative care**

Screening for Ca. Cervix

- **Pap test** at **beginning of sexual activity** & then **every 3 years thereafter**.

- Directed to women in **poor socio-economic groups- greater risk**

- Problems: -

- 1) **Related to diseases**: - one criteria for screening that must be fullfilled before a screening programme can be initiated is that natural history of the disease & its latent development must be adequately understood. Many gaps in natural H/o

- 2) **Related to test**: - False negative rate is 20% (sensitivity is 80%). **Sensitivity** also depends on whether **cervical smear** is prepared from **vaginal aspiration** or **direct cervical scraping.**

Screening for Ca. Breast

- **Breast self-examination by the patient**

  – All women should be encouraged to perform breast self-examination.

- **Palpation by physician**

  – during routine examination

- **Thermography**

  – not a sensitive tool.

- **Mammography - Most sensitive & specific in detecting small tumors.**

  – **Drawbacks**: -

- I) exposure to radiation & breast cancer

- ii) requires technical equipment of high standard & radiologist with considerable experience.

So, can't be used for mass screening programmes

Screening for Ca. Lung

- **CXR**
- **Sputum Cytology**

Screening for Oral Cancer

????

Cancer is a word, not a sentence…..

~John Diamond

EPIDEMIOLOGY OF ORAL CANCER

- One of the ten most common cancers in the world.
- **Problem in India**: - **50-70 %** of all cancer diagnosed
- **Epidemiological features**: -
  - **Tobacco**: - 90% of all cancer in SEAR are linked to tobacco chewing & tobacco smoking.
  - Cancer almost always occurred on the **side of the mouth** where the **tobacco quid** was kept & risk was 36 times higher if the quid was kept in the mouth during sleep.
  - **Alcohol**

Other risk factors

- Excessive sun exposure

- Poor oral hygiene

- Long standing dental caries

- Poor oral cleaning after chewing tobacco

- Dental trauma

- Poor fitting denture

- Sharp tooth

- X-rays - Cumulative exposure

- Biological factors: - Viruses and fungus - HPV 16

- Malnutrition

- **Pre-cancerous stage**: -
  - Often accompanies
  - can be detected at least 15 years prior to invasive carcinoma.
- **High risk group**: - tobacco chewers & smokers
- **Cultural patterns**: -
  - **betel quid-** consist of **betel leaf, arecanut, lime & tobacco-** *common for poorer people to rub with the thumb flakes of sun-dried tobacco & slaked lime in the palm of their left hand until the desired mixture is obtained. The mixture- Khaini- is then put into the mouth in small amounts & at frequent intervals during day & slowly sucked & swallowed after dilution with saliva.*

- **In eastern coastal regions of A.P.** –
  - Epidermoid carcinoma of hard palate- due to reverse smoking of cigar.- smoking with burning end inside mouth.

Warning signs

- Leukoplakia

- Erythroplakia

- Lump or thickening of oral soft tissue

- Soreness or "lump" in throat

- Difficulty chewing or swallowing

- **Difficulty in opening of mouth**

- Bleeding mouth

- Ear pain

- Difficulty moving jaw, tongue

- Hoarseness, change of voice

- **Characteristics:**
  - Usually a painless swelling, lump.
  - Lag period of 10-15 yrs from precancerous signs to cancer.
  - Any ulcer for more than 2 weeks may be painless, non- healing.
  - Bleeding oral cavity.
  - Any small swelling < 2 weeks.
- **Diagnosis:**
  - Blood tests
  - X-rays
  - Endoscopy
  - Biopsy

PRIMARY PREVENTION

- Elimination of tobacco habits – by intensive public education & motivation for changing life styles supported by legislative measures like banning or restricting the sale of tobacco.

- **Care to take:**
  - Keep oral cavity clean & hygiene.
  - Check for any malformed tooth or dental caries.
  - Have nutritious diet.
  - Persons with tobacco habit check oral cavity monthly, regularly.
  - Check for the danger signs.
  - If any immediate refer to doctor.

SECONDARY PREVENTION

- If detected early, then can be treated or cured.

- Leukoplakias can be cured by cessation of tobacco use. Other modalities are surgery & radiotherapy. Decide type of treatment.

- Treatment: Multidisciplinary treatment is ideal.

- Three types of treatments:

  – Surgery

  – Radiation

  – Chemotherapy

- General health of mouth is analyzed and treatment accordingly

SECONDARY PREVENTION (contd.)

Treatment according to stage

- 1) Surgery:
  - Initial stage: - best results.
  - Removal of affected part with at least 2cm of normal margin.
  - Generally accompanied by radiation.
  - Severe cases: - Removal of portion of mandible and Facial reconstruction is needed.

  - ❑ **Radiation**: - Powerful rays are transmitted across body.

- 2) Radical radiotherapy: -
  - where surgery not possible,
  - Prior to surgery: -to reduce bleeding, de-bulking of tumor.
- 3) Palliative radiotherapy: -
  - For last stage, where any kind of Mx is not possible.

- 4) Chemotherapy:
  - **Last preferred** mode of Mx for oral cancer.
  - For disseminated cancer, usually **third stage.**
  - Needs variety of drugs that destruct cells.
  - Highly costly, with lots of side effects.
  - May be used prior to surgery.

Epidemiology of Lung Cancer

- **Epidemiological features: -**

1)   Age & sex: -

       1/3rd of all lung cancer death – below age of 65.

       In industrialized countries- more female are involved.

2) Risk factors: -

 Smoking: -

- Lung cancer risk for cigarette smokers is **8.6 times higher than non-smokers**.

- Risk is related to no. of cigarettes smoked, **age of starting** to smoke & smoking habits- such as **inhalation, no. of puffs & the nicotine/tar content & length of cigarettes**.

Other factors: - air pollution, radioactivity occupational exposure to asbestoses, As, Cr, PAH etc.

Primary Prevention

- Control smoking epidemic.

- **Public information & education:** create public awareness about hazards of smoking through mass media with greater emphasis on young people & school children

- **National anti-smoking campaign** - to change human behavior of life style associated with smoking.

- **FCTC , COTPA**

Legislative & restrictive measures:-

- Control of sales promotion, health warnings on cigarette packets & advertisements, product description showing yield of harmful substances, imposition of upper limits for harmful substances in smoking materials, taxation, sales restriction, restriction on smoking in public places & at places of work.

- Display of statutory warning……..

'cigarette smoking is injurious to health'

- **Smoking cessation activities**

  – 90% of those who give up smoking do so of their own volition- without use of any specific therapy. *(Carried out through smoking cessation clinics, nicotine substitute, hypnosis etc.)*

- **National & international co ordination**

  – Coordinated political & non political approaches at local, national & international levels

SECONDARY PREEVENTION

- Early detection & treatment

- Very costly.

Epidemiology of Ca. Cervix

- Cancer of the female reproductive tract
- Second most common cancer in women world wide (#2 globally)
- Most common cancer in women in developing countries (#1 in Indian women)
- Easiest gynecologic cancer to prevent through screening

Agent

- The central cause of cervical cancer is human papilloma virus or **HPV**

- HPV is **sexually transmitted**

- **Different types** of HPV:

  - **Low-risk types** can cause warts

  - **High-risk types** can cause cancer of the cervix

Morphological changes – Ca. Cervix

Normal cervix → Pre-Ca. stage → Invasive Ca. → Death
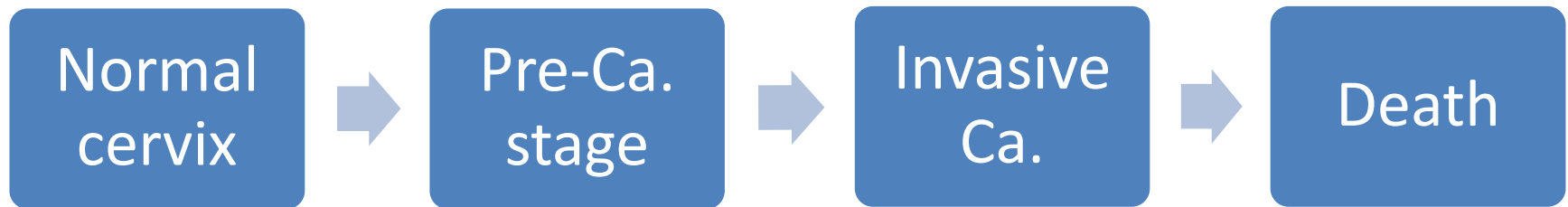
Risk factors

- **Age**: - 25- 45 years - commoner

- **Genital warts**: - Past or present genital warts

- **Marital status**: - Less likely in single. More among widowed, divorced or separated & having multiple sexual partners. Common among CSWs.

- **Early marriage**: - Early marriage, early coitus, early child bearing, repeated childbirths

- **Oral contraceptive pills**: ?

- **Socio-economical class**: - Lower class

Q.1. If someone has HPV, does it mean she will get cancer?

NO! In most cases HPV goes away. Only women with persistent HPV (where the virus does not go away) are at risk for cervical cancer

Q. 2.How common is HPV?

- Most men and women who have had sex have been exposed to HPV. More than 75% of sexually active women tested have been exposed to HPV by age 18-22.

Q. 3. What are the symptoms of cervical cancer?

- Non healing ulcer or swelling

- Abnormal bleeding

  – Between periods

  – With intercourse

  – After menopause

- Other symptoms

  – Leg pain

  – Pelvic pain

  – Bleeding from the rectum or bladder

- Diagnosis

  – Pap test

  – cervical biopsy

  – colposcopy

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Q.3a What is a Pap test?

- A test which collects cells **from the surface of the cervix** and looks for any abnormal cells.

- Abnormal cells can be treated before cervical cancer develops

- When cancer is detected early, it is easier to treat

Q.4. When does one need her first Pap test?

- At the time of sexual intercourse consummation & every 3 years thereafter

Q. 5. How often does one need a Pap test?

- Every year until age 30. After age 30, if you have only had normal results, you may have them every two to three years after discussion with your physician and evaluation of your risk factors

If one feels fine, so why does one need a Pap test?

- A Pap test can find treatable changes of the cervix (precancer) before one has a symptom or notice a problem

- Once a problem is symptomatic, it is harder to treat

Q.6. What is the best time to have a Pap test?

- Schedule Pap when one is not having menstrual period.

- Best to **abstain from intercourse**

- **Avoid use of tampons or douches** for two days before the Pap test

Q. 7. Do one need a Pap test if she had a hysterectomy?

- If one had Mx for pre-cancer or Ca. cervix, one may need a Pap test

- If the cervix was left in place at the time of hysterectomy, one will still need Pap test

- Preventive health care is still important even if one does not need a Pap test

Q. 8. What is the chance of survival after treatment?

FIGO Stage	5-Year Survival
Stage IVA	15-20%
Stage III	35-50%
Stage II	65-87%
Stage I	81-96%

Q. 9. How do one can lower the risk?

- **Delayed onset of sexual activity**
- **Know the sexual partner**
- **Practice safe sex**
- **Do not smoke**
- **Maintain good personal hygiene & take healthy diet**
- **Early detection of cases through screening**

PREVENTION

Primary Prevention - Improved personal hygiene & birth control

Secondary prevention –

Early detection through screening

Treatment by radical Surgery & radiotherapy.

5 year survival rate is –

- 100% for carcinoma in situ
- 79% for local invasive disease
- 45% for regional invasive diseases.

BREAST CANCER

- One of the commonest causes of death in many developed countries

Risk factors: -

- **1) Age: -**
  - Uncommon below ages of 35 & 50
  - **A light bimodal trend** - dip in incidence at menopause & secondary rise in frequency - after the age of 65.
  - Women <40 with Ca. Breast = 3 times more risk of developing a second breast cancer

2) **Family history** - Esp. if mother or sisters develop cancer

3) **Parity** - An early first, full term pregnancy and h/o breast feeding- **protective** role.

4) **First pregnancy**- **delayed** upto late 30 – at greater risk

5) **Age at menarche & menopause** - **Early menarche** & **late menopause**

6) **Hormonal factors** - **Elevated** estrogen as well as progesterone

7) **Prior breast biopsy** - for benign disease- increases risk

8) **Diet** - **high fat diet** – increased risk

9) **Socio-economic status** - **Higher socioeconomic group-** delayed marriage

10) **Others** - Radiation, **oral contraceptives** etc.

PREVENTION

- **Primary Prevention:**

  – Elimination of risk factors

  – Promotion of cancer education

  – Average age at menarche could be increased by reduction in childhood obesity & increase in strenuous physical activity.

- **Secondary prevention: -**

  – Breast screening leads to early diagnosis of breast cancer- useful for treatment.

  – **Main component is follow-up**. To detect recurrence as early as possible, to detect cancer in the opposite breast at an early stage.

National Cancer Control Programme (NCCP)

- Started in 1975-'76 – central sector project
- In 1981 – cancer registries introduced
- Then re-termed as…NCCP in 1985

Objectives of NCCP

- 1^0 prevention - TRCs (Tobacco-related ca.)

- Early detection and diagnosis – Ca. Cervix, breast, oropharyngeal ca.

- Strenghthening existing Mx facilities

- Increasing access to palliative care

- Training of manpower

Strategies

- Primary prevention & primordial prevention for TRCs

- Targeting …
  - Total population &
  - Vulnerable (high-risk) population (mainly children & adolescents)

FCTC

Specific Protection

- No specific protection against majority of ca.
- Though,
- Hepatitis B vaccination
- Avoidance of sun-rays
- Encouraging GLVs, fruits, dietary fibers, etc.
- HE about warning signals (Slide # 25)
- Pap smear for Ca. Cervix (>35 yrs. Age, once in 3 yrs. min.)

Regional Cancer Centers

- RCCs
- 17 RCCs for diagnosis, treatment and f/u
- Undertake surveys on mortality and morbidity
- HE & research
- Purchase of equipments
- Funded by NCCP

District Cancer Control Programme

- Health education
- Early detection of cancer
- Pain relief / palliative Mx
- Training – medical, paramedical staff
- Intersectoral coordination
- Monitoring of activities

National Cancer Registry Programme (NCRP)

- By ICMR – in 1981-'82

- **Objectives:**
  - Cancer incidence & trends
  - Geographic variations
  - Associated risk factors
  - Evaluate effectiveness
  - Epidemiology & operational research

Mechanism

- **Hospital-based regisries (HBCR):**
  - Dibrugarh, Trivendrum, Chennai, Mumbai, Banglore, Chandigarh
  - No denominator – population at risk
  - Info. on cancer extents, stages, therapy & survival rates

Mechanism

- **Population-based regisries (PBCR):**
  - Chennai, Mumbai, Delhi, Banglore, Bhopal, Ahmedabad
  - One rural site – Barshi, Maharashtra
  - Urban population – 12%
  - Rural population – 0.06% covered
  - Total avg. population covered – 3.3%

Uses of PBCR

- Provides valuable epidemiological data on …
  - Incidence of various ca.
  - Crude incidence rates
  - Age-adjusted std. incidence rates
  - Annual age-adjusted incidence rates
  - Truncated incidence rates (35-64 yrs.) (>60% of ca. in this age grp.)

Palliative Care

- *'Active total care of patients whose disease is not responsive to curative treatment.'* – **WHO**
- Nothing more to offer to pts. with advanced, terminal cancer to control their disease.
- **Hospice** –
    - Specialized ICU,
    - with trained team,
    - each pt. is special,
    - right to the very end &
    - best place for terminal care of ca. pts.

Example: Shanti Avedna Ashram, Mumbai

Functions of Hospice

- Relief from pain
- Relief from 'fear' of pain
- Psychological support
- Social support
- Management of other symptoms specific to ca.

If children have the ability to ignore all odds and percentages, then maybe we can all learn from them. When you think about it, what other choice is there but to hope? We have two options, medically and emotionally: give up, or fight like hell.

~Lance Armstrong

When the Japanese mend broken objects, they aggrandize the damage by filling the cracks with gold. They believe that when something's suffered damage and has a history it becomes more beautiful…

Some see a
hopeless end,
while others see
an endless hope…

Thank You...