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CHILDHOOD CANCER : A REVIEW

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INTRODUCTION:

- An abnormal growth of cells which tends proliferate in an uncontrol way and, in some cases, to metastasize.
- Cancer is not one disease; it is group of more than 100 different and distinctive diseases. The types of cancer that occur in children and adolescents are different from those that occur in adults.(1)
- 'Childhood' refers to those children aged 0 to 14, inclusively. Childhood cancers are generally very different to those seen in adults. In the childhood cancer have a common disease process-cells grow out of controlled, develop abnormal sizes and shapes,ignore their typical boundaries inside the body, destroy their neighbour cells, and ultimately can spread to either of organand tissue.(2)
- Leading forms of childhood cancer (ages 0-19) leukemia (26%), brain cancer and central nervous system (CNS) (18%), and lymphoma (14%). Some cancers that develop in children are rarely seen in adults, especially those cancers that come from embryonic cells and from developing tissue and organs. Embryonic cancer includes neuroblastoma (sensory nerve system), Wilms tumor or nephroblastoma (growing kidney), medulloblastomas (brain), rhabdomyosarcoma (muscle), and retinoblastoma (eye retina). Some childhood cancers, most common in adolescents, are very similar to those in adults(3).
- Treatment of childhood cancer in specialized centres is coordinated by a team of experts who know proper medications for the cancer.
- By combining appropriate, contextual, and child-centred adjustments, researchers can help children and adolescents with cancer effectively and logically describe their illnesses while developing a positive view of participating in future research.

1.1 HISTORY & DISCOVERY:

- Much progress has been made in the treatment of childhood cancer in recent decades, and many of these cancers are still curable. However, the progression in some cancers has been greater than in others.

- Five-year survival rates when discussing cancer survival statistics, doctors often use a number called the 5-year survival rate.Remember that 5-year survival rates are based on patients who have been diagnosed and treated at least 5 years ago. Advances in treatment often result in a better view of recently diagnosed patients. Of course, many children live much longer than 5 years, and many are cured. The 5-year survival rates for the most recent time period (2004-2010) for the more.

- More than 13,000 children are expected to be diagnosed with cancer in the United States by 2019, with more than 80% of them living longer. Some of these advances in cancer care and survival rates may be due to advances in medical technology and training; however, many are the direct result of child and adolescent participation in clinical trials and adjuvant research.

- In fact, according to Unger and colleagues, it is estimated that more than 50 percent of children with cancer under the age of 15 agree to participate in clinical trials; a proportion 10 times greater than found for adults with cancer, perhaps in part due to initiatives set forth by the Children's Oncology Group (COG).

- By incorporating developmentally appropriate, context-specific, and child-centre adjustments, researchers can help children and adolescents with cancer effectively and meaningfully describe their illness experiences while also developing a positive outlook on future research participation.

- Survival rates are based on previous outcomes of large numbers of children who had the disease, but they are at best rough estimates and can't predict what will happen in any child's case.

1.2 Pathophysiology of Childhood Cancer:

In cancer, altered cells are produced by abnormal cell growth due to damage to the normalgene that controls them. So, the odd match is in these

The genes that control the 4 cells are as follows:

i) ***Activation of growth-promoting oncogenes*** that cause cell mutations (a mutant type of proto-oncogene common in cancer is called oncogene). Many of these cancer- associated genes, oncogenes, are first identified in viruses, hence the name v-onc. The genetic products of oncogenes are called oncoproteins. Oncogenes are considered as potent as they emerge despite the presence of regular proto-oncogenes.

ii) ***Cancer genetic mutations (i.e. inactivation of anti-oncogenes)*** that allow for cell proliferation of mutated cells. Anti-oncogenes work in a repetitive manner i.e. they only work if both alleles are damaged.

iii) ***Abnormal apoptosis regulatory genes*** which may act as oncogenes or anti- oncogenes. Accordingly, these genes may be active in dominant or recessive form.

iv) ***Failures of DNA repair genes*** and thus inability to repair the DNA damage resultingin mutations.[4]

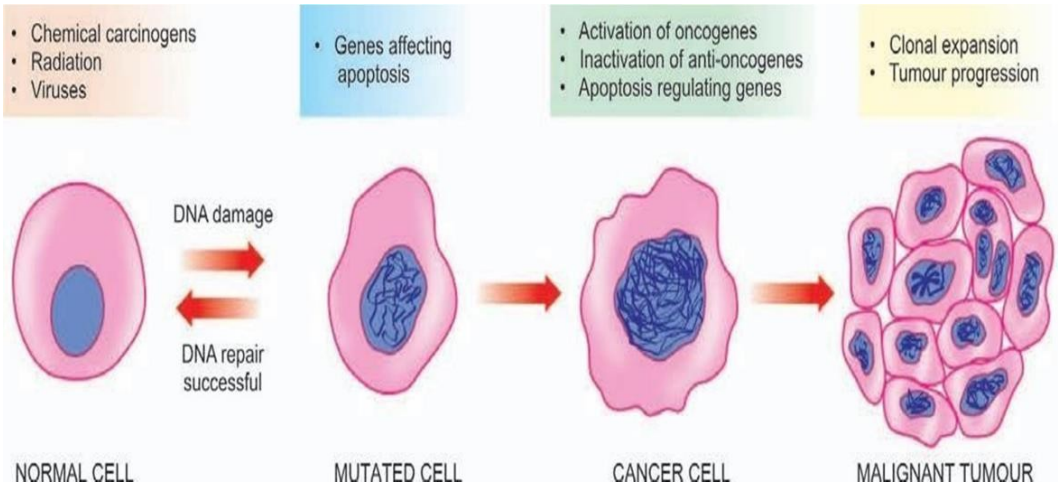

Fig. 1 Pathophysiology of Childhood Cancer

Literature Review:

1. **Neil L and Clarke S, et.al , 28 Sep 2013**

Studied this article offers an analysis of literature on paternal and maternal development and resilience via the experience of having a child diagnosed, treated, and maybe die from most cancers the methods and analysis of discovering from lookup performed in this vicinity are assessed, as are the data's relevance and implications for practice. The evaluation required an in depth search of applicable fitness care databases nine excellent search terms. Findings were then culled and analysed based on inclusion and exclusion standards and two papers had been deemed appropriate for resolution four contrasting topics emerged from every article it was generally recounted that moms and fathers enduring such an trip cited that adjustments occurred in their lives the mothers failed a neced to become more challenging for their child and family, and the father identified a need to focus quickly onwhat wanted to be finished to deal with their child's illness. However, analytically the differences in every paper are vast[5]

2. **Sadhna M. Shankar, et.al , March 2005**

Studied the improvement of curative remedy for most paediatric malignancies has produced a pawing population of childhood most cancers survivors who are at elevated risk for a range of fitness problems resulting from their most cancers or its remedy due to the fact of the reality that many moment-related sequel may now not come to be clinically apparent until the survivor attains maturity or begins to age, the capacity of most important care providers to anticipate late outcomes of realment imperative for supplying well timed interventions that prevent or correct these squeal and their negative outcomes on satisfactory of life.

Altered bone metabolism all through treatment for childhood most cancers may additionally intervene with attainment of top bone mass, doubtlessly predisposing to untimely onset of and extra severe problems associated to osteopenia and osteoporosis. Bone mineral deficits have been stated after remedy for a range of paediatric malignancies and signify morbidity that. Can be reduced or avoided through lifestyle modifications and interest to different frequent cancer-related squeal such as hypogonadism, the children oncology group long- term follow-up hints for survivors of childhood, adolescent and young grown up cancers supply risk-based surveillance suggestions that are based on expert opinion and overview of scientific literature for attainable late results of paediatric cancer therapy such as osteopenia. This overview summarizes the present literature that has described traits of most cancers survivors at chance for bone mineral deficits and contributed to surveillance and counselling suggestion outlined in children's oncology team long-term follow-up guidelines.[6]

3. J.E.W.M.VanDongen-Melman et.al , August 1997

studied the literature regarding the psychosocial aspects of childhood most cancers is evaluation the emphasis of literature is on the have an impact on of the disorder on the toddler and family and depicts the life-situation when faced with childhood cancer and responses to the diseases, the literature strongly suggests that households trip serious difficulties and are a population at threat of developing psychosocial problems.
The strategy of studying the baby with most cancers and family is discussed and hints aremade for future research[7]

3. Types Of Childhood Cancer:

The most common types of cancer in children are different from those seen in adults.Themost common cancers in children are:

- Acute lymphocytic leukemias (ALL): 89%
- Acute myelogenous leukemias (AML): 64%
- Brain and other organs of the central nervous system: 72%
- Wilms tumors: 90%
- Hodgkin lymphomas: 97%
- Non-Hodgkin lymphomas: 88%
- Rhabdomyosarcoma: 68%
- Neuroblastomas: 79%
- Retinoblastomas: 97%
- Orthopedic cancer:3%
- Osteosarcoma: 71%
- Ewing sarcoma: 75%
- Germ Cell tumors: 10%

Some types of cancer are rare in children, but they do occur sometimes. In very rare cases, children may develop the most common cancer in adults.

Leukemia:
Leukemias, a cancer of the bone marrow and blood, is the most common cancer in children. The most common types in children are acute lymphocytic leukemia (ALL) and acute myelogenous leukemia (AML). Thisleukemia can cause bone and joint pain, fatigue, weakness, pale skin, bleeding or abrasions, fever, weight loss, and other symptoms. Acute
leukemia can develop rapidly, so it needs treatment (usually chemotherapy) as soon as it isdiagnosed[7]

This prevents the production of:

- Red blood cells (RBCs): Cells that carry oxygen to the muscles.
- White blood cells (WBC): Cells that fight infection.
- Platelets: The portion of blood needed for digestion.

Brain tumor and central nervous system:
Brain tumors and the nervous system are the second most common cancer in children, accounting for about 26% of childhood cancers. There are many types of brain tumors, and each treatment and observation is different. Many brain tumors in children begin in the lower parts of the brain, such as the cerebellum or the stem of the brain. They can cause headaches, nausea, vomiting, blurred vision or dizziness, dizziness, impotence, or other symptoms.
Adults are more likely to develop tumors in the upper parts of the brain. Spinal cord tumorsare less common than brain tissue in children and adults.

Neuroblastoma:
Neuroblastoma begins with the early (immature) types of nerve cells found in the developing fetus or embryo. About 6% of pediatric cancers are neuroblastomas. This type of cancer occurs in infants and toddlers. It is rarely found in children over 10 years of age. The tumor usually begins in the adrenal glands, which are located above the kidneys and are part of the body's endocrine (hormonal) system. It can also cause bone pain and fever.

Wilms tumor:
Wilms tumor (also called nephroblastoma) develops in one, or rarely, in both kidneys. It is most commonly found in children ages 3 to 4, and is rarely found in children over 6 years of age. It can appear as a swelling or a lump in the stomach (stomach). Sometimes a child may have other symptoms, such as fever, pain, nausea, or anorexia. Wilms tumor makes up about5% of childhood cancers.

Lymphoma:
These cancers originate in certain immune cells called lymphocytes. They usually grow on lymph nodes and other lymph nodes, such as tonsils or thymus Lymphomas can affect bone
marrow and other organs, and can cause a variety of symptoms depending on where the cancer is. Lymphomas can cause weight loss, fever, sweating, fatigue (fatigue), and lumps (swollen lymph nodes) under the skin on the neck, armpits, or breasts. The two main types of lymphoma are Hodgkin lymphoma (sometimes called Hodgkin's disease) and non-Hodgkin lymphoma. Both types occur in children as well as in adults.

Hodgkin lymphoma:
It Accounts for about 3% of childhood cancers. It is most common, however, in the 2-year group: premature growth (15 to 40 years, usually 20-year-olds) and late aging (after 55 years). Hodgkin lymphoma is uncommon in children under 5 years of age. This type of cancer is very common in children and adults, which includes the best treatments work.

Non-Hodgkin lymphoma:
It causes about 5% of childhood cancers. It is most likely in children younger than Hodgkin lymphoma, but it is still rare in children under 3. The most common types of non-Hodgkin lymphoma in children are different from those in adults. These cancers usually grow quickly and require intensive treatment, but they also tend to respond better to treatment than most non-Hodgkin lymphomas in adults.[8]

Rhabdomyosarcoma:
Rhabdomyosarcoma begins in cells that normally grow into skeletal muscle. (These are the tissues we control to move parts of our body.) This type of cancer can spread to almost any part of the body, including the head and neck, pelvis, abdomen (abdomen), hip, or arm or leg.
. It may cause pain, swelling (swelling), or both. This is the most common type of soft tissue sarcoma in children. It causes about 3% of childhood cancers.

Retinoblastoma:
Retinoblastoma is an eye cancer that is an eye tumor. It causes about 2% of childhood cancers. It usually occurs in children up to 2 years of age, and is rarely found in children older than 6 Retinoblastoma are usually found because a parent or doctor sees a child's eye looking unusual. Normally when you light a lamp in a baby's eye, the pupil (black spot in the middle of the eye) looks red due to the blood in the arteries behind the eye. In an eye with retinoblastoma, the pupil usually looks white or pink. This glare can be seen immediately after a bright photo is taken.

Orthopaedic cancer:
Primary bone cancer (cancer that starts in the bones) is more common in older children and adolescents, but can develop at any age. About 3% of childhood cancers found.
Primary bone cancer is different from bone cancer, which is a cancer that starts somewhere in the body and then spreads to the bones. Metastatic bone cancer is much more common than primary cancer because many types of cancer (including many cancers in adults) can spread to the bones. Two main types of primary cancer occur inchildren.

Osteosarcoma:
It is most common in young people, accounting for about 2% of childhood cancers and usually develops in areas where the bone grows rapidly, such as at the end of long bones in the legs or arms. It often causes worse bone pain at night or at work. It can also cause inflammation in the area around the bone.

Ewing sarcoma:
It is a rare form of about 1% of bone cancer, which can cause bone pain and inflammation It is commonly found in young people. The most common places to start are the pelvic bones (hip), the chest wall (such as the ribs or shoulder blades), or between the bones of the long legs.

Germ cell tumors:
They are rare tumors that start in boy's testicles or that produce girl's eggs. This type of cancer includes testicular cancer (8%) and cervical cancer (2%) Rarely, these tumors canstart in other parts of the body, including the brain.

Pleuropulmonaryblastoma (PPB):A rare form of pulmonary embolism that occurs in the chest, either in the lung tissue (pulmonary) or in the lining of the lungs and inside thepleura, also called the chest cavity.

SYMPTOMS:

When childhood cancer is detected by a variety of technologies, relieving various symptoms plays an important role in cancer care and treatment. This can be called palliative care or supportive care.
It usually starts after a diagnosis and continues during full treatment.

- **C**ontinued, Sudden unexplained weight loss
- **H**eadaches frequently, often with early morning vomiting
- **I**ncreased swelling or persistent pain in the bones, joints, back, or legs
- **L**ump or mass, especially in the abdomen, neck, chest, pelvis, or armpits
- **D**evelopment of excessive bruising, bleeding, or rash
- **C**onstant, frequent, or persistent infections
- **A** whitish colour behind the pupil
- **N**ausea that persists or vomiting without nausea
- **C**onstant tiredness or loss of energy and noticeable paleness
- **E**ye or vision changes that occur suddenly and persist
- **R**ecurring or persistent fevers of unknown origin or illness that doesn't go away

CAUSES OF CHILDHOOD CANCER:

A risk factor is anything that affects the chance of getting a disease like cancer. Differentcancers have different risk factors.

- Lifestyle-related risk factors play a major role in types of cancer in adults.
  Examples include being overweight, eating an unhealthy diet, getting enough exercise, and habits like smoking and drinking alcohol. But the lifestyle often takes years to contribute to the risk of cancer, and it is not thought to play a major role in childhood cancer.
- A few environmental factors, such as radiation sure, have been linked with some types of childhood cancers.Some studies have suggested that exposure to parents (such as smoking) may increase a child's risk of developing cancer, but further research is needed to evaluate these potential links. To date, most childhood cancers have not been shown to have external causes.
- In recent years, scientists se made great progress in understanding how certain changes in our DNA can cause cells become cancerous.
- DNA is the chemical in each of our cells that makes up our genes - the instruction for nearly everything our cells do. We usually look like our parents because they the sourceof our DNA. It also contributes to the risks of developing certain diseases, including certain types of cancer.
- Some genes (DNA components) control when our cells grow, divide into new cells, and die. The genes that help to grow, differentiate, or survive are called oncogenes.Others that's low down cell division or cells to die at the right time are called tumor suppressor genes.
- Cancer can be caused by mutations in the DNA of oncogenes or by suppressing genes that suppress the tumor.These changes are present in every cell of the child's body,and can often be tested for in the DNA of blood cells or other body cells.
- Some of these DNA mutations are only linked to an increased risk of cancer, while others can cause diseases that include other health or developmental problems. But many childhood cancers are not the result of hereditary changes.
- They are the result of DNA mutations that occur early in life, sometimes even before birth. Each time a cell prepares to divide into 2 new cells, it must copy its own DNA.

DIAGNOSIS OF CHILDHOOD CANCER:

Blood tests:

A blood test measures the number of different types of cells in a person's blood. The first test performed for leukemia is a blood test. Blood samples are usually taken from a vein in the arm, but in infants and young children, they may be taken from other veins (such as the feet or head) or the toe. Blood counts and blood smears are the most common tests performed on these samples. A total blood count (CBC) is performed to determine the number of blood cells in each blood type. For a blood smear, a small sample of blood is spread on a glass slide and viewed under a microscope. Some very high or very low cell levels may indicate the presence of certain types of childhood cancers.

Bone marrow aspiration and biopsy:

Bone marrow samples are obtained from bone marrow aspiration and biopsy - these 2 tests are usually performed simultaneously to examine the bone marrow, which is spongy, fatty tissue found inside large bones. Samples are usually taken behind the pelvic bones (hip), but in some cases they may be taken in front of the pelvic bones, the thoracic bone (sternum [rarely in children]), or in other bones. For bone marrow aspiration, the skin above the hip bone is cleansed and numbed with a local anesthetic. In many cases, the child is given other painkillers or sleep apnea during surgery. A small, empty needle is inserted into the bone and a syringe is used to absorb a small amount of fluid from the bone marrow. Bone marrow biopsy is usually performed just after wish. A small piece of bone and bone marrow is removed with a larger needle twisted as it is thrown down to the bone. Once the biopsy is complete, pressure will be applied to the area to help prevent any bleeding. These bone marrow tests are used to diagnose leukemia and may be repeated later to show if leukemia responds to treatment.

Lumbar puncture (spinal tap):

Lumbar puncture or spinal tap is a procedure in which a needle is used to take a sample of spinal fluid (CSF) to look for cancer cells or tumor symptoms.

Abscess markers are substances found in excessive amounts in the blood, urine, or body tissues of people with certain types of cancer.

Cerebral Spinal Fluid (CSF) is a fluid that circulates around the brain and spinal cord. Children are usually given an anesthetic on the lower back before the procedure or othermedications to calm or relax the baby (feeding).

Other blood tests:

Children with leukemia will be tested for certain chemicals in the blood to see how well their immune systems are functioning. These tests are not used to diagnose leukemia, but in children who are already diagnosed, it may help to detect damage to the liver, kidneys, or other organs caused by the spread of blood cells or certain chemotherapy. measuring blood levels of essential minerals, and making sure the blood is clotting properly.Children can also be tested for diseases in the blood. It is important to diagnose and treat diseases quickly in children with leukemia because their weakened immune system can allow the disease to spread quickly.

Imaging tests:

Imaging is the use of x-rays, sound waves, magnetic fields, or radiation particles to produce images inside the body. Leukemia rarely develops abscesses, so imaging studies are not helpful for some types of cancer. But if leukemia is suspected or diagnosed, your child's doctor may prescribe one of these tests to get a better view of the disease or to look at other problems, such as infections.

Magnetic resonance imaging (MRI):

The use of MRI and radio waves to show changes in soft tissues without the use of x-rays to produce detailed body images. MRI can also be used to measure tumor size. A special dye used called a medium is applied before scanning to create a clearer image. This dye can be injected into a patient's veins or given as a pill or liquid to be swallowed.

Ultrasound:

Ultrasound uses sound waves to create an image of internal organs. Patients often awake

during the ultrasound.

Chest x-rays:

A chest x-ray can help identify an enlarged thymus or lymph nodes in the chest. If the result is abnormal, a computed tomography (CT) chest scan can be performed to get a detailed view of the chest x-rays can also help diagnose pneumonia if your baby may have lung disease.

Fig.2 Chest x-rays

Computed tomography (CT) scan:

Fig.3 Computed tomography (CT) scan

Computed tomography (CT) is the use of x-rays to produce a distinct cross section image of a body part. The computer then assembles the images into a detailed, three-dimensional image that shows any abnormalities or flaws. A CT scan can also be used to measure tumour size. In some cases, a special dye called contrast medium is applied before scanning to give better details to the image. This dye can be injected into a patient's veins or given as a pill or liquid to be swallowed. If possible, it is best to have these tests done in a special paediatric centre where paediatricians can be monitored. These centres are aware of the potentialdangers of radiation exposure from CT scans.

A CT scan is a type of x-ray scan that produces detailed, distinct images of the body. Unlike normal x-rays, CT scans can show details on soft tissues such as internal organs.

The computer then assembles the images into detailed images of the body part being studied. Prior to the scan, your child may be asked to take a comparative remedy and / or receive an intravenous (IV) injection dosage that helps to better identify abnormal areas in the body. The child may need an IV line where the comparison dye is injected.[11]

IV injection of bright dye can cause a feeling of warmth or warmth on the face or elsewhere. Some people experience allergies and experience constipation or, rarely, have serious reactions such as shortness of breath and low blood pressure. Be sure to tell the doctor if your child has an allergy or has ever had a reaction to any of the x-rays.

CT scans take longer than regular x-rays. The CT scanner is described as a large donor, with a small table in the middle of an open area. During testing, the table slides in and out of the scanner. Some people feel a little trapped during the scan

Positron emission tomography (PET) or PET-CT scan:

A PET scan is usually combined with a CT scan (see above), called a PET-CT scan. However, you may hear your doctor refer to this procedure as a PET scan. A PET scan is a procedure to take pictures of organs and tissues within the body. A small amount of radiation sugar is injected into the patient's body. This sugar substance is absorbed by cells that use a lot of energy. Because cancer tends to use energy more actively, it absorbs more radioactive substance. However, the radioactivity in an object is so low that it can be harmful to patients. The scanner then detects the object to produce images inside the body.

Scans or radioisotope studies:

In these processes, a substance with a small amount of radioactive substance (called a tracer) is injected into the body and followed by a special camera or x-ray to see wherethat is going. These studies can find abnormalities in the liver, brain, bones, kidneys, and other organs.

PREVENTION OF CHILDHOOD CANCER:

In Child Cancer, there are no risk factors associated with lifestyle (such as smoking). Very few environmental factors, such as radiation exposure, have been linked to the risk of childhood cancer. Even then, in many cases radiation exposure can be avoided, as a child needs radiation therapy to treat another cancer.

Blood tests:

- The first test performed for leukemia is a blood test.
- Blood samples are usually taken from the veins in the arm, but in infants and young children, they may be taken from other arteries (such as the feet or the head) or "fingertips."
- Blood counts and blood smears are the most common tests performed on these samples.
- A total blood count (CBC) is performed to determine the number of blood cells in eachblood type.
- For a blood test, a small sample of blood is spread on a glass slide and viewed under amicroscope.
- Abnormal numbers of blood cells and changes in the appearance of these cells may makea doctor suspect of leukemia.
- Most children with acute leukemia - lymphocytic or myeloid - will have more white blood cells and less adequate red blood cells and / or platelets.
- Most white blood cells will rupture, the first type of blood cell that is usually found onlyin the bone marrow.

Bone marrow aspiration and biopsy:

- Bone marrow samples are obtained from bone marrow aspiration and biopsy-2 testsusually performed simultaneously.
- Samples are usually taken behind the pelvie (hip) bones, but in some cases they may be taken in front of the pelvic bones, the chest (sternum [rarely in children]), or other bones.
- For bone marrow aspiration, the skin above the hip bone is cleansed and numb to local nerves. In many cases, the child is given other painkillers or sleep apnea during surgery.
- A small, empty needle is inserted into the bone and a syringe is used to absorb a smallamount of bone marrow.
- Bone marrow biopsy is usually done soon after delivery. A small piece of bone and bone marrow is removed with a larger folding needle as it is thrown down to the bone.
- Once a biopsy has been performed, pressure will be applied to the area to prevent any bleeding. These bone marrow transplants are used to diagnose leukemia.

Lumbar puncture (spinal tap):

- This test is used to look for leukemia cells in cerebrospinal fluid (CSF), which is the fluidthat cleanses the brain and spinal cord.
- In this test, the doctor first touches the area below the spine over the spine. The doctor usually also gives the child sleeping pills during the procedure.
- A small empty needle is then inserted between the spinal cord to extract certain fluids.
- In children who have been diagnosed with leukemia, the first lumbar puncture is also used to give chemotherapy to CSF in an attempt to prevent or treat the spread of leukemiain the spine and brain.

Screening for childhood cancers:

- Screening to diagnose a disease such as cancer in people without symptoms.
- Pediatric cancer is rare, and there are no commonly recommended screening tests for cancer in children who are not at high risk.
- Some children are more likely to get a certain type of cancer because of certain genetic mutations in a parent. These children may need careful medical examinations, including specialized tests to detect early signs of cancer. Possible signs and symptoms of cancer in children
- Most cancers in children are diagnosed early, either by a pediatrician or parents or relatives. But cancer in children can be difficult to detect immediately because early symptoms are often the same as those caused by more common illnesses or injuries.
- Babies often get sick or have bumps or bruises that may hide the first signs of cancer.
- Parents should make sure that their children are regularly examined by a doctor and that they look for any unusual signs or symptoms.[12]

TREATMENT OF CHILDHOOD CANCER:

Treatment for child cancer is based primarily on the type and stage (level) of the cancer. Treatment options may include surgery, radiation therapy,

chemotherapy, and / or other treatments. In most cases, more than one of these treatments is used. There are exceptions, but pediatric cancer usually responds well to chemotherapy because it is usually a fast- growing cancer (Many forms of chemotherapy affect rapidly growing cells). Children's bodies are also often better able to recover from higher doses of chemotherapy than Adults' bodies. Taking intensive care gives doctors a better chance of successfully treating cancer, but it can also lead to short-term and long-term side effects. Unlike chemotherapy, radiation can often cause more serious side effects in children (especially very young children) than adults, so its use sometimes requires moderation Doctors do their best to balance the need for strong treatment and the desire to limit side effects as much as possible.

The types of systemic treatments used for childhood cancer include:

- Chemotherapy
- Immunotherapy
- Radiotherapy

➢ **Chemotherapy:**

Chemotherapy is the use of drugs to destroy cancer cells, usually by keeping the cancer cells from growing, dividing, and making more cells[13]. The most commonly used chemotherapeutics are classified according to the procedure into the following five categories:

(i) Alkylating agents such as nitrogen mustard or platinum-based agents form DNA inter- or intra-strand cross-links or transmit alkyl groups of guanine DNA residues that lead to abnormal formation on DNA bases and prevents cord fragmentation during DNA synthesis.

(ii) Antimetabolites such as 5-fluorouracil disrupt important biosynthetic pathways, disrupt DNA and RNA binding, or induce DNA strand formation by inhibiting enzymes such as ribonucleotide reductase and DNA polymerase or promoting the installation of an analogue foundation for a false structure of DNA.[14]

(iii) Topoisomerase inhibitors such as topotecan or doxorubicin inhibit the DNA processing activity of these enzymes that cause the breakdown of DNA strands.

(iv) Mitotic spindle inhibitors such as taxane or alkaloids alter the function or formation of spindle microtubules and prevent chromosome separation and nuclear dissociation resultingin mitotic binding and eventual cell death.

(v) Other chemotherapeutic agents include enzymes, proteosome inhibitors, tyrosine kinase inhibitors, and antibiotics.

➢ **Immunotherapy:**

Immunotherapy, also called biologic therapy, is designed to improve the body's natural defence against cancer. It uses organic or laboratory materials to improve, identify, or restore immune function.

Examples of immunotherapy include cancer vaccines, monoclonal antibodies, and interferon.

➢ **Radiation Therapy:**

Radiation therapy is the use of high-energy x-rays or other particles such as photons to destroy cancer cells. A doctor who specializes in providing radiation therapy to treat cancer is called a radiation oncologist. Because healthy organs and tissues in the radiation system are at risk of injury and secondary cancer, especially in young children, doctors often try to avoid or reduce the use of radiation therapy in this age group if possible.

The most common type of radiation therapy is called external-beam radiation, which is radiation emitted from a machine outside the body. When radiation therapy is given using herbs, it is called internal radiation therapy or brachytherapy. New radiation methods are also being developed[15]

External Beam RadiationTherapy (EBRT):

The clinical use of ionizing radiation (IR) in EBRT is used to treat approximately 60 percent of all cancer patients. Only a small percentage of patients are treated with brachytherapy or radioisotopes in very specific tumor companies. The genotoxic effect of IR is used to kill harmful cells or to activate their proliferation in order to eliminate clonogenic expansion. However, EBRT is definitely associated with normal patient tissue exposure with high field- based and secondary out-of-field doses that vary greatly depending on tumor organization, EBRT method used, radiation quality, and tumor volume.[16]

Bone marrow transplantation/stem cell transplantation:

Bone marrow transplantation is a medical procedure in which the cancerous bone marrow is replaced by specialized cells. These cells, called stem cells hematopoietic, grow into healthy bone marrow. Hematopoietic stem cells form blood cells found in both blood and bone marrow. This process is also called stem cell transplant, blood stem cell transplant, or hematopoietic stem cell transplant.[17] There are 2 types of hematopoietic stem cell implants depending on the source of the changing stem cells:

i. allogeneic (ALLO)
ii. autologous (AUTO)

ALLO uses stem cells donated to another person, while AUTO uses patient stem cells. In both cases, the goal is to destroy all cancer cells in the bone marrow, blood, and other parts of the body by using high doses of chemotherapy and / or radiation therapy and allowing blood cell replacement to form healthy bone marrow.

RISK FACTORS FOR CHILHOOD CANCER:

Because cancer is not a single disease, it has no underlying cause. Many of the causes or risk factors may affect a person's risk of developing cancer. Risk factors vary in the type of each cancer. It is important to remember that 1 in 3 people will develop cancer in their own time. Some harmful substances can be controlled and some may not. Genetics play a major role in many colds, such as breast and colon cancer. This means that a family health history can be dangerous for some types of cancer. The personal decisions we make in our lifestyle can increase our risk of cancer. These choices are called lifestyle factors, and include smoking, heavy drinking, and eating foods high in calories, high in fat, and low in fibre.
Other risk factors are related to sexual contact and exposure to the sun.

Life style factor:

Tobacco:

Thirty percent of all cancers are attributed to smoking or chewing tobacco. Cigarette smoking is also associated with cancers of the mouth, pharynx, larynx, oesophagus, pancreas, kidney, and bladder.[24]

Diet:

Researchers found that different types of food you eat affect your risk of developing cancer. Approximately 30% of cancers are related to diet. Infectious Agents Some viruses have the ability to transform cells into cancer.
Examples include (a) human papilloma virus (HPV) and cervical cancer
(b) Epstein-Barr virus and lymphoma.

Occupational Exposure:

Occupational exposure includes high-risk occupations such as uranium miners, asbestos factory workers, certain chemical plant workers, and workers in nuclear power plants.

Reproductive Factors:

The reproductive factors category refers mostly to women's risk factors. For example, the risk of breast cancergoes up if a woman does not have in children

Sedentary Lifestyle:

Not moving around much during the day may increase the risk of cancer. The body's own defences work better when you exercise and maintain an ideal weight. Moderate exercise such as walking or climbing a flight of stairs can help

Alcohol/Drugs:

Alcohol contributes to the risk of developing cancer. People who drink too much or abuse drugs may not eat well or take care of themselves, which will increase their overall risk of cancer.

Pollution:

Although people think environmental pollution is a major of cancer, in fact few cancers have been found to be caused by pollution, but research is still ongoing. The cause of many cancers is not known. Other factors that interact to increase the risk of cancer are age, hormonal balance, response to stress, and status of the immune system

CONCLUSION:

It serves as a tool to address important issues such as the risk of secondary malignancies, endocrine and reproductive effects, cardiopulmonary complications, and psychological effects between this unique and ever-growing figure. Further advances in differentiation are now achieved through laboratory techniques using molecular biology, immunology, and cytogenetic, which are important in etiologic studies, diagnosis, treatment, and prognosis. It may be important in the future for cancer registrars to record the results of appropriate laboratory tests for further subtype analysis.

The results of this Final Report should be carefully interpreted and integrated with existing biological and epidemiologic information. Due to

the small number of research studies, the analysis is sensitive to random numerical variables, which can lead to inaccuracies in estimates (shown by wide confidence intervals). Based on a combination of experimental criteria for determining risk factor and cancer.

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