Side effect of chemotherapy in paediatric oncology

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Introduction

- Chemotherapy agents or anti-cancer drugs/medicines are agents that demonstrate activity against malignant diseases.
- Malignancy is a term for diseases in which abnormal cells divide without control and can invade nearby tissues.
- Malignant cell can also spread to other parts of the body through the blood lymph system

Some fact about Chemotherapy Agents

Agent	Examples	Mechanism of Action	Side Effects
Alkylating	Cyclophosphamide, cisclacin, chlorambucil	Acts on cells at all stages of the cell cycle	>10% reddening of skin hyperuricemia ulcerative stomatitis. Glossitis, gingivitis, nausea and vomiting. Diarrhoea, anorexia intestinal perforation, mucositis leukopenia thrombocytopenia, Renal failure. Alopecia, Bone marrow suppression, /mylosuppresson, anaemia, Neuropathy, erythema, blisters, estravasation
Antimetabolites	Methotrexate, 5-flurouracil, cytarabin, mercaptopurine	They act as false substrate during RNA and DNA synthesis. It inhbits dihydrofolic acid reductase; inhibits purine and thymidylic acid synthesis, which in turn interferes with DNA synthesis, repairs, and cellular replication; cell cycle specific for S phase of cycle	
Antibiotics	Doxorubicine, mitoxantrone, bleomycin,	They cause the strands of genetic material that make up DNA to uncoil hence preventing cells from reproducing	
Miscellneous	Hydroxyurea, Topo-isomerase inhibitors		
Vinca alkaloids	Vincristin, vinblastin, vindecine, vinorelbine	They arrest dividing cells in metaphase by binding tubulin and preventing its polymerisation in micro tubules and they cause neuropathy by inhibiting anterograde and retrograde axonal transport causing axonal degeneration	

Cell Cycle

- Eukaryotic cells have nucleus and organelles enclose in nuclear membrane.
- Some proliferate or divide continuously in order to repair themselves when there is a damage.
- Example are epithelial cells of the skin, gastro intestinal tract, urinary tract/urethra, the vagina an the stem cells in the bone marrow.
- They undergo cell cycle which is an ordered sequence of event that the cell undergo in preparation for cell division (mitosis)
- It starts from the interphase (G0, G1, S and G2 stages) then a checkpoint stage before mitosis (prophase, metaphase, anaphase, telophase and cytokinesis)

Cell Cycle

- Prophase is the first phase
- During prophase the DNA complex in the nucleus known as chromatin condenses
- In metaphase the chromozomes are at their second most condensed and coiled stage the chroozomes alyn the equator of the cell
- Anaphase is the 3rd phase when replicated chromosome or daughter chromatine move to the opposite poles of the cell
- Telophase is the final stage where the genetic material in the nucleus is carried to the daughter cells. It begins when the replicated paired chromozomes have been separated and pulled to the opposite sides of the cell
- Finally, two daughter cells are formed when the cytoplasm divides by cytokinesis.