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CLINICAL BULLETIN

Chemotherapy & Glove Use

Chemotherapy uses chemical agents (anti-cancer or cytotoxic drugs) to interact with cancer cells to eradicate or control the growth of cancer. Chemotherapy is often given in conjunction with surgery and radiation therapy.

All cells, healthy and malignant, go through distinct phases in their life cycle - called the cell cycle. Chemotherapy drugs are designed to disrupt a cell's function at one or all of these phases. It is also important to know that normal cells, as well as cancer cells, are affected by chemotherapy, and the cause of unpleasant side effects is toxicity of the drugs to normal cells.[1] Since different chemical agents' damage cancer cells in different ways and at different phases in the cell cycle, a combination of drugs is often employed to increase the cancerous cell-killing effectiveness.[1] This is called combination chemotherapy (often referred to as a chemo cocktail).

Chemotherapy drugs can be divided into several groups based upon factors such as how they work, their chemical structure and their relationship to other drugs. More than 100 chemotherapy drugs are used today – either alone or in combination with other drugs.[2] How differently these drugs kill cancer cells, or prevent them from dividing, depends on their classification. Drugs in the same class kill cancer cells by the same mechanism: they all attack the same target within the cell.

Chemotherapeutic agents are administered in a variety of methods including, oral chemotherapy; intravenous chemotherapy; and intrathecal and intraperitoneal chemotherapy. No matter what method is used, chemotherapy drugs are absorbed into the blood and carried around the body. Of all the methods of chemotherapy drug administration, intravenous injection is most commonly used. It is the most efficient way to get the medication into the bloodstream.[1]

Handling of chemotherapy drugs poses potential occupational risks and certified personal protective equipment such as gloves, gowns and respiratory protection are required. Chemicals may permeate gloves without visibly affecting the materials and thus gain access to the skin in an insidious manner. If a chemical permeates through the glove, it may cause adverse effects to the skin or it can be absorbed through the skin and cause exposure effects elsewhere in the body.[3] Furthermore, the interaction of the glove material to the chemical in use is important, because if one chemical degrades the glove material, it can aid in the permeation of other chemicals or microorganisms.[3] It is crucial to be aware that chemical permeation through disposable gloves can sometimes be efficient and rapid.[3]

The nature of chemotherapy drugs makes them harmful to healthy cells and tissues as well as cancerous cells. For cancer patients, treatment with these agents can be beneficial. However, for healthcare providers who are exposed to chemotherapy drugs as part of their work, precautions must be taken to eliminate or reduce the potential for exposure. Chronic effects identified in patients given these drugs include cancer, infertility, miscarriage, birth defects, damage to the liver and kidney, bone marrow, the lungs and heart, and hearing impairment. Acute effects may include headache, nausea, irritation of eyes, skin and mucous membranes, allergic reactions and skin rash. Employees inadvertently exposed may have similar effects. The risk varies with the specific drug and its concentration and with the frequency and duration of exposure.[4]

There are two primary reasons to wear personal protective gloves when working with chemo drugs. First and foremost, to protect the individual from exposure to a potentially harmful substance and secondarily to protect the product from contamination. How then does an individual working in these environments and potentially exposed to these types of chemical compounds know whether the gloves they are wearing will provide adequate protection? Gloves designed to be used in these environments can be evaluated for their protective qualities when in contact with chemical substances. This is done by conducting what's known as a chemical permeation test conducted under the guidance of industry consensus standards. The gold standard for medical gloves is the ASTM D6978 Assessment of Resistance of Medical Gloves to Permeation by Chemotherapy Drugs. This is the only test that uses chemotherapy drugs in the test method. In Europe, gloves may also be required to meet the EN norms (EN 374 and 455). Select only gloves that have passed the ASTM D6978 standard test and that verify permeation time and rate to choose the right glove. Gloves not tested for use with chemotherapy drugs should not be used!

Guideline for Glove Selection

Two pairs of chemotherapy-tested gloves should be worn for all chemo handling activities. Before handling chemotherapy drugs, always inspect gloves for holes, tears or any type of defect. Unless the film is intact, it cannot provide a barrier. Change gloves every 30 minutes or immediately if damaged or knowingly contaminated.[5] Gloves must be disposable and powder-free. Powder can contaminate the work area and can absorb and retain hazardous drugs. Skin contact with contaminated powder may increase the risk of drug absorption.[6] Generally chemotherapy gloves are made from nitrile, neoprene, polyisoprene or latex (never select vinyl); they are available in a variety of colors (there are no guidelines regarding specific required colors); and have a cuff long enough to cover the sleeves of the gown. Thickness will vary per glove material. Although sterile surgical gloves are recommended for preparation, administration, clean up and general handling, sterility is not always required, as for example, direct patient care, handling laundry, and housekeeping procedures.[5] Hands should be washed immediately after removing gloves.

When selecting gloves for practice, it is important to ensure that the product is functional and effective. Involve staff members in the product decision. Consider ordering samples of several types of chemotherapy-tested gloves, then have staff member's trial the gloves in the clinical setting. Evaluate for quality, flexibility, durability, and other indicators identified by those using the gloves. Include price in the comparison.[5] All personnel involved in any aspect of handling chemotherapy drugs must receive training on chemotherapy drugs including proper selection and use of protective equipment.

References

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North America
Ansell Healthcare Products LLC
111 Wood Avenue South
Suite 210
Iselin, NJ 08830, USA

Europe, Middle East & Africa
Ansell Healthcare Europe NV
Riverside Business Part
Blvd International 55
1070 Brussels, Belgium

Asia Pacific
Ansell Services Asia Sdn. Bhd.
Prima 6, Prima Avenue
Block 3512, Jalan Teknokrat 6
63000 Cyberjaya, Malaysia

Australia & New Zealand
Ansell Limited
Level 3, 678 Victoria Street
Richmond, Vic, 3121
Australia