Safe Compounding; it’s in your Hands

INTRODUCTION
Cytotoxic chemotherapy is one of the most frequently used treatments for cancer. Unfortunately, it is well known that preparing cytotoxic agents is potentially hazardous for the operator. Cytotoxics are known to be:
- Mutagenic
- Carcinogenic
- Teratogenic

The gloves currently in use in the Regional Oncology Haematology Pharmacy (ROHP) are:
- Latex
- Neoprene
- Nitrile

Three main glove types are used for handling cytotoxics.

AIM
To determine whether the gloves in current use at the (ROHP) are the most appropriate type for handling and compounding cytotoxic drugs.

METHODS
1) Literature review of best practice recommendations was performed.
2) Surveyed other hospitals and commercial compounding units about the types of gloves used when handling cytotoxics.
3) Contacted glove manufacturers to find out what they recommend for handling and compounding cytotoxics and attained samples on foot of these recommendations.
4) Assessed different gloves in terms of permeability to cytotoxics, comfort, cost and sterility.

RESULTS
1. Literature Review
There have been a number of studies conducted comparing permeabilities of different types of gloves to different cytotoxic agents. It is difficult to compare the results of these studies as they were undertaken using different glove types and thicknesses, different experimental conditions and using different types of cytotoxic drugs.

Best practice recommendations on choosing a glove type:
1) Select powder free gloves.
2) Longer gloves that cover gown cuff protect wrist from exposure.
3) Double gloving is better than one thicker single glove.
4) Change gloves every hour or immediately if contamination occurs.
5) Inspect gloves for visible defects before use.
6) Use good quality gloves that have been tested for permeability to hazardous drugs.

Three main glove types are used for handling cytotoxics.

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<tr>
<th>Glove Type</th>
<th>Advantage</th>
<th>Disadvantage</th>
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<tbody>
<tr>
<td>Latex</td>
<td>Recommended by OSHA for handling cytotoxics. Good elasticity. Available.</td>
<td>Operators allergic to latex cannot use. Resistance to puncture and permeability depends on thickness of the glove being used.</td>
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<tr>
<td>Neoprene</td>
<td>Allergy is not a problem. Very comfortable.</td>
<td>More expensive than latex. Less puncture resistant than others.</td>
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<tr>
<td>Nitrile</td>
<td>Very high tensile strength. Excellent barrier to harsh chemicals. Highest puncture resistance.</td>
<td>More expensive than latex.</td>
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Studies by Wallenmacq et al have shown later gloves with a thickness of at least 0.24mm and nitrile gloves with a thickness of at least 0.16mm have high resistance to permeation to cytotoxics.

Standards
Currently there are two standards for testing permeability of gloves to cytotoxics: a European (EN 374 3: 2003) and an American (ASTM D 6978-05) standard. The American standard is much more robust. When comparing glove types they should perform well in the American test.

2. Hospital and Commercial Compounding Unit Survey
The survey showed a wide variation in the types of gloves used in different centres and for different activities. This highlights the absence of an agreed standard in Ireland for handling cytotoxics.

3. Wallemacq et al. Permeability of 13 different gloves to 13 cytotoxic agents under controlled dynamic conditions. *Staff chose this glove for compounding, even though the manufacturer recommends changing every 30 mins. This glove was easier to change in the isolator and comfortable to use. The underglove has permeation data up to 480 mins for all drugs used in the ROHP, so staff will be protected in the event of accidental spillage. (Accidental spillage on Berner Z plus gloves would not be expected to affect the integrity of the isolator).


References