A multidisciplinary team approach to ensuring safe administration of a desensitization protocol involving a cytotoxic medication

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INTRODUCTION
- 45-year-old man with resected Stage III colorectal cancer was to receive 12 cycles of FOLFOX (leucovorin, 5-fluorouracil, oxaliplatin).
- During the 7th FOLFOX treatment, the patient experienced a grade III hypersensitivity reaction after 2 minutes of oxaliplatin infusion.
  - Generalized erythema, rash on torso, diaphoresis, hypotension, O₂ desaturation. Patient received medications, IV fluids, supplemental O₂ and was discharged home in stable condition after several hours.
- Due to curative intent of chemotherapy and increased efficacy of oxaliplatin-based chemotherapy, the oncologist wished to continue FOLFOX.
- Immunology was consulted to determine whether patient can receive oxaliplatin despite having a hypersensitivity reaction.
- As per recommendation from allergist, patient would require oxaliplatin desensitization at each subsequent FOLFOX treatment.
- No prior platinum chemotherapy desensitization had been performed at St. Michael’s Hospital.
- Despite published oxaliplatin desensitization protocols and case reports, limited details exist in literature regarding preparation, handling and administration considerations.¹ ²
- Patient’s chemotherapy was stopped after 1 oxaliplatin desensitization treatment due to worsening neuropathy attributed to oxaliplatin.
- St. Michael’s Hospital REB approval was obtained for publication of this case.

OBJECTIVE
- To identify practical considerations and solutions to enable safe administration of oxaliplatin desensitization in an intensive-care unit at a tertiary hospital

METHODS
- Contacted Dr. Mariana Castells and team at Brigham and Women’s College Hospital Drug Hypersensitivity and Desensitization Centre in Boston, Massachusetts due to their expertise in high risk desensitization.¹ ²
- Established interdisciplinary team because multiple services involved
- Team used meetings and emails to identify challenges, propose and implement solutions

RESULTS

Challenge
Lack of stability data for very low concentrations of oxaliplatin in IV bags used in desensitization protocol
Need for standardized prescribing, and clear communication of steps for preparation and infusion of oxaliplatin IV bags
Need to satisfy safety requirements for handling cytotoxic drug during preparation and infusion of oxaliplatin IV bags
DSW in drip chamber inappropriately diluting the oxaliplatin solution
Appropriate and adequate staffing

Solution
Oxaliplatin stability data on product monograph extrapolated to apply to concentrations in the protocol
Rationale: oxaliplatin not known to leach or adhere to polyvinyl PL 146 plastic IV bags
Stakeholder input
Pharmacy department developed: 1. Pharmacy worksheet for bag preparation Figure 3
2. Physician’s Orders template Figure 4
3. Nursing MAR with detailed instructions for execution of protocol Figure 5
IV line primed with DSW to avoid exposure to cytotoxic medication
IV line measured to have 15 mL volume, hence first 15 mL at the beginning of each new IV bag rapidly infused into an empty IV bag before connecting to patient’s IV access and starting infusion at rate as per protocol. Instruction for RN outlined in MAR Figure 5
Drip chamber and line primed with DSW
Invert drip chamber and squeeze content back into IV bag
Spire oxaliplatin bag with line. Fill drip chamber to fill line with IV bg contents.
Instruction for RN outlined in MAR Figure 5
Compounding pharmacist and pharmacy technician work hours adjusted to enable oxaliplatin bags compounded and delivered to ICU by 0800h on day of treatment
Chemotherapy-certified ICU nurse assigned to care for patient in ICU
ICU nurse educator, managers, oncology pharmacist on standby to assist during administration
Oncologist and allergist available by pager

RESULTS (continued)

16-step oxaliplatin desensitization protocol based on patient’s calculated oxaliplatin dose from Castells et al. Figure 2

Table 1. Team members involved in planning and preparation of the desensitization protocol

<table>
<thead>
<tr>
<th>Team member</th>
<th>Role</th>
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<tbody>
<tr>
<td>Pharmacy managers</td>
<td>Oncology pharmacist</td>
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<tr>
<td>Oncology pharmacist</td>
<td>Compounding pharmacist</td>
</tr>
<tr>
<td>Clinical pharmacist</td>
<td>And Endorsed by Medicine</td>
</tr>
<tr>
<td>ICU clinical leader</td>
<td>ICU nurse</td>
</tr>
<tr>
<td>ICU nurse educator</td>
<td>Oncology nurse</td>
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<tr>
<td>ICU nurse specialist</td>
<td>Allergist</td>
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<tr>
<td>ICU attending</td>
<td>Medication Administration Record Form</td>
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</tbody>
</table>

Table 2. Identified challenges and implemented solutions

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<th>Solution</th>
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REFERENCES

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The authors have no conflict of interest to declare.