

HTA report on the microbiological risk associated with contrast medium administration in computerized axial tomography at the CHUQ

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INTRODUCTION

The growing concern about nosocomial infection prevention, over the past few years, highlights the importance of patient and staff safety for health care institutions. Questions have been raised concerning safety of the technique used for intravenous (IV) contrast medium (CM) administration in computerized axial tomography at the CHUQ medical Imaging Department. According to the current procedure, a single CM container, set up on an injection system, is used consecutively for IV injections in multiple patients (See Figure 1). Because of conflicting views and costs regarding the application of not to reuse medical devices for CM administration, the Risk Management Committee has requested an advice from the CHUQ HTA Unit to assist in decision making.

OBJECTIVES

- Assess the risk of contamination and infection associated with IV CM administration
- Suggest preventive measures to decrease the risk and assess their financial and organizational impacts

METHODS

A literature search was performed in multiple databases to identify original articles on the risk of contamination and infections associated with IV CM administration. Article selection, quality evaluation and data extraction were performed by two independent reviewers. A multidisciplinary work group including experts was also established. Other information was harvested from direct observation and questionnaires sent to seven university hospitals. Cost-analysis of different options was performed.

Figure 1

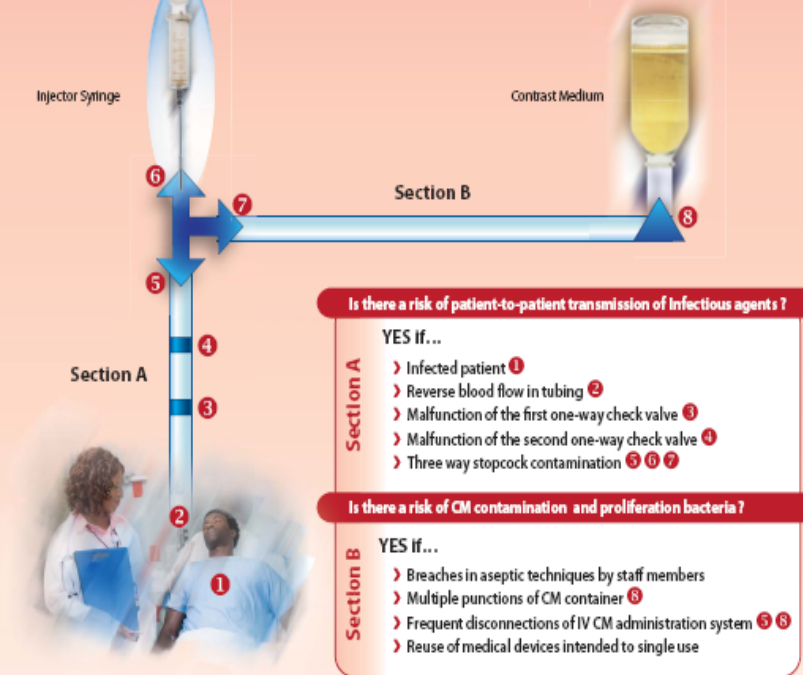
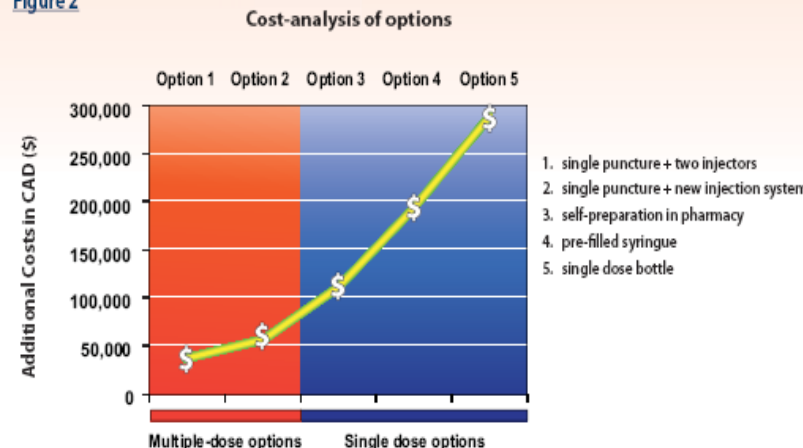


Figure 2



RESULTS

Potential hazard identified from the direct observation at the CHUQ Medical Imaging Department were as follow (see Figure 1):

- Multiple withdrawals and punctures of multiple CM containers intended for single puncture 6
- Sharing of medical devices by several patients (tubing connecting the CM container to the injector syringe) 5, 6, 7
- Malfunction of one-way check valves 3, 4

Studies showed that CM contamination and proliferation of bacteria are possible in container if breaches in asepsis occur. Under normal conditions of use, one-way check valves appeared to be effective in preventing contamination from reverse blood flow. Cases of infections by different microorganism (bacteria, parasites, viruses) have been documented in patients following IV CM administration. Breaches in aseptic techniques by staff members were the main presumed cause for patient-to-patient transmission. Using single-dose containers and material for every patient, estimated additional costs of these options range from 108,000\$ to 286,000\$ (CAD) per year (see Figure 2). Using multidose containers for multiple patients as well as adding precaution measures could increase costs from 35,000\$ to 54,000\$ per year (CAD).

CONCLUSIONS

Considering the importance given by the CHUQ to safe health care services, the presumption that the risk of patient-to-patient infection transmission is practically nonexistent at the time of intravenous CM administration with strict asepsis measures and based on the analysis of scientific evidence available and the additional costs associated with the different options for intravenous CM administration using single-dose containers, it was recommended to carry on with the administration of CM using multidose containers for multiple patients as well as a partly shared injection system but under specific conditions including:

- reinforce the rules of asepsis;
- perforate the CM container membrane only once;
- maintain the current schedule of replacement of the syringe and tubing connecting the CM container to the injector every 4 hours;
- maintain the use of tubing with two sprung check valves to connect the injector to the patient and the current schedule of replacement for every patient;
- dispose of any unused portion of CM within a maximum of 8 hours after opening;
- include all above conditions within a written procedure which must be taught to the personal and formally evaluated;
- institute ongoing surveillance procedures of fever or chills episodes to monitor the efficacy of the practice in patients receiving IV CM injection.