ABSTRACT

OBJECTIVE: to analyze the present-day accuracy and efficiency of the i.v. Station Onco Hazardous Compounding Robot at the Juravinski Cancer Centre (JCC) in Hamilton, Ontario.

DESIGN: Data was collected from the i.v. Station database software, as well as from OMNICELL engineers. With this data, analysis was preformed on the percentage of completed preparation vs. failed preparations to determine the overall accuracy of the robot. The i.v. Station software was also used to collect batching and patient specific compounding data.

RESULTS: Currently to date, the i.v. Station Onco produces an average of 30% of all patient specific medications at the JCC with an overall accuracy pass rate of 96.5%. In regards to batching, the i.v. Station Onco produces on average 180 & 75 doses per month of Doxorubicin 40 mg and 5-Flurouracil 2500 mg syringes respectively.

CONCLUSION: Presently at the JCC, roughly 3 out of every 10 patients have robot made preparations. The i.v. Station Onco produces nearly all doses of Doxorubicin 40mg and 5-Flurouracil 2500mg via batching. The Juravinski Cancer Centre (JCC) is hopeful to soon reach our goal of 60% following the upcoming Omnicell upgrade.

INTRODUCTION

Automation is designed to streamline and improve the accuracy and efficiency of the manual intravenous compounding process. Manual compounding is physically demanding and requires many steps and checks prior to being released to the patient. There is risk for human error, along with repetitive strain injuries towards staff members.

The Juravinski Cancer Centre (JCC) in Hamilton, Ontario, has installed an “i.v. Station Onco”, a fully automated hazardous compounding robot, manufactured by Omnicell. With the use of robotics, the overarching goal is to increase dose accuracy and staff safety as production increases over time.

The objective of this study was to analyze the uptake in use of the i.v. Station Onco in regards to hazardous drug preparation at the JCC.

METHODS

Data was collected from the Onco robot software, as well as from Omnicell engineers, and OPIS.

These statistics were able to identify the number of patients served during this 6 week (30 day) snapshot, and compare with the number of patient doses that the i.v. Station Onco prepared during this time. With the Onco software, calculations were preformed in order to determine the overall accuracy of the robot when taking into consideration the total failed preparations vs. the total preparations made over this period. The Onco software was also used to collect batching data as well as production numbers by drug.

RESULTS

On average 30% of patients receiving chemotherapy at the Juravinski Cancer Centre have robot made patient specific products.

Chart 1 shows current day production numbers by drug. In this snapshot, 35% of passed preparations coming from the Onco are patient specific, while 65% are batched doses of 5-Flurouracil and Doxorubicin.

Chart 2 shows an accuracy rate of 96.5% in respect to a 1380 prep pass vs 50 prep fail during this period.

Chart 3 shows batching production numbers of 572 & 318 of Doxorubicin and 5-Flurouracil respectively. During this snapshot, the Onco prepared a total of 890 batched products and 474 patient specific doses.

DISCUSSION

Hamilton Health Sciences invested in robotic technology for hazardous IV compounding at the Juravinski Cancer Centre site in order to increase dose accuracy as well as staff safety. Our data shows that roughly 3 out of every 10 patients have doses prepared by the robot (not including batched preparations.)

During our use of the i.v. Station Onco we have identified the following strengths and challenges of robotic technology:

Strengths:
- Safety & Accuracy: Bar code verification, image verification, gravimetric measuring, automated final labeling, automated waste sealing
- Doesn’t need to “rest”
- Potential to reduce waste
- Great help desk support

Challenges:
- Limited amount of drugs: Due to the high temperature of the internal compartment, only drugs stable at higher temperatures can be used currently (following the next upgrade a chiller unit will be installed to solve this issue).
- Slow: 5-7 minutes to prepare an iv bag & 2-5 minutes to prepare a syringe on average.
- Some vial sizes are currently not compatible with the robot.

CONCLUSIONS

While we have faced some challenges implementing the robot, we have been able to successfully address and resolve most issues, and we will continue to work with the vendor to improve the functionality of this device. Overall, this technology has provided us with a valuable tool in the production of chemotherapy, allowing us to improve both the safety and efficiency of chemotherapy drug preparation. The Juravinski Cancer Centre is currently preparing around 30% of chemotherapy doses with the robot and hope to soon reach our goal of 60% following the upcoming Omnicell upgrade.