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A Review of an Ambulatory Chemotherapy Facility, First Time in Sri Lanka

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Abstract

Ambulatory Chemotherapy (AC) allows the delivery of extended chemotherapy infusions through an ambulatory pump. Patients can have chemotherapy comfortably at home and minimize the hospital stay hence, can reduce the annual health budget. It is essential to select suitable candidates to ensure both patient safety and the success of the treatment session.

Historically the provision of chemotherapy infusions is solely delivered on an inward basis in Oncology wards. Breakthrough in oncology clinical practice gradually shifted chemotherapy provision in outpatient settings. However, 24 h or 48 h continuous chemotherapy infusion essentially requires inward admissions. During inward stay also they have to restrict their mobility to the bed site and always needed to mobilize with the saline stand or interrupt the chemotherapy infusion. There are many practical problems and risks of chemotherapy- associated side effects with these regimens.

The concept of administration of chemotherapy outside the hospital started back in 2007 in the United Kingdom. That is through Mobile Chemotherapy Units (MCU) and these MCUs are driven to a specified location conveniently close to patients. MCUs are managed by the same staff operating in an outpatient area. Subsequently, home chemotherapy or hospital at home care developed. Administration of intravenous chemotherapy at home under direct medical supervision by a specialized nurse; suited for patients wanting to avoid admissions for infusion lasting hours and days.

Keywords: Ambulatory chemotherapy infusion pumps; Port A catheter; FOLFOX; Chemotherapy; Quality of life

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Introduction

The concept of ambulatory chemotherapy pumps developed over the last five years. Delivery of chemotherapy outside the hospital using a portable infusion pump. This modality enables the patients to receive continuous infusion lasting up to seven days while freely ambulating. These facilities are commonly seen in Developed and Western countries such as UK, Canada, USA [1,2].

The connected infusion pump might need to be replaced or refilled during the course of treatment, depending on its capacity and length of continuous infusion. This is carried out by the visiting specialized nurse or during another hospital visit. There are different types of portable infusion pumps in the market with variable specifications. These should be connected to the patients either peripherally or through a central access device.

The purpose of this article is to present the experience of ambulatory chemotherapy delivery first time in Sri Lanka and share relevant practice experience including problems encountered their safety and experience to date since we started the practice.

First time in Sri Lanka at Sir John Kotelawala Defence University Hospital (UHKDU) Oncology Department started the ambulatory chemotherapy facility for patients with chemotherapy regimens contains continuous infusion. Patient assessment for ambulatory chemotherapy is essential. Selecting suitable candidates to ensure both their safety and success of treatment sessions. This requires a delicate balance between clinical assessment and patient acceptance.

The clinical assessment comprised of five checkpoints. The first assessment includes performance status (WHO-0) following hospital discharge. All 24 patients treated with ambulatory chemotherapy were with WHO performance scale 0 at UHKDU. The very first patient who obtained this facility was a doctor.

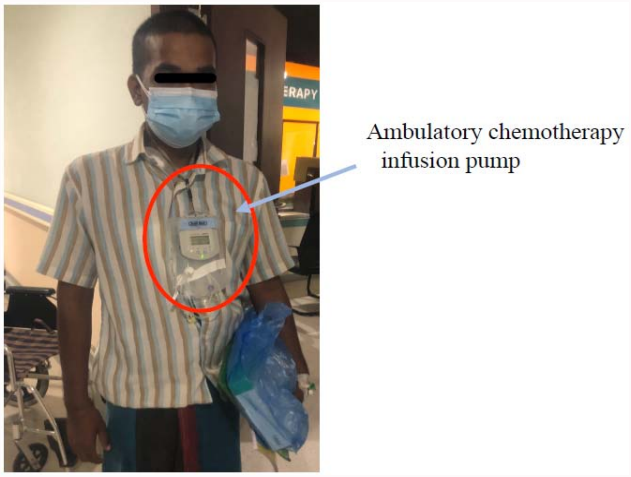

Figure 1: A 40 years old patient with FOLFOX regimen in his 6th cycle ready to go home with Ambulatory Chemotherapy pump.

The second checkpoint relates to the suitability of chemotherapy agent to ambulatory pump. Published studies confirmed that Ifosfamide, Trabectidin and Fluorouracil could be safely used on an ambulatory basis without the need for direct continuous medical monitoring [3-5]. Over the last five months since April 2021 at UHKDU Oncology department used ambulatory chemotherapy pumps for the FOLFOX regime for colorectal carcinoma which carries 48 h continuous infusion (Figure 1). And continuous 5-FU infusion for Head and neck cancer patients for five days (D1-D5) following IV Cisplatin day one. Such infusions are used for 24 patients more than 94 times to date.

The third checkpoint is having a means of communication such as a mobile phone to facilitate access to support in case of Emergency.

The ability for self-care and management of side effects comprises the fourth checkpoint. It entails a clean home environment confirmed by the patient and caregiver.

Proximity to the hospital is the fifth checkpoint ensuring access to support in case of emergency. A 30 min to 60 min travel time is acceptable; otherwise, patients are invited to be in a nearby hotel. The very first patient at UHKDU with an ambulatory chemotherapy pump was with continuous 5-FU infusion spent at KDU hotel which was within the hospital premises. Oncology department nurses and medical officers visited the patient once to make sure the safety and the success of the infusion. No significant adverse events reported to date.

The selection of an infusion pump is very important. The choice of pump lies in the detailed assessment of its context. A pump connected to a patient planned to discharge should most importantly be lightweight and are without programming errors. The pump should have a high level of accuracy as we are using it to deliver toxic medications which carry complications if extravasated.

There are two main types of infusion pumps, battery operated and disposable mechanical. At UHKDU we are using a battery-operated one as it is simple and safe to use. The pump is equipped with alarms to notify errors such as low battery power, occlusion, faults and air in the line. These pumps also provide high dose rate accuracy [6-9].

During COVID-19 pandemic, the US Food and Drug Administration (FDA) issued a report authorizing the use of infusion pumps and their accessories to treat COVID-19 infected patients. In that report, the FDA emphasize the importance of cleaning these reusable infusion pumps. At UHKDU during the COVID-19 pandemic patients were advised to maintain their own, cover bag and a belt, so that the reusable pump would not contaminate. Patients are advised not to shower or bath while a battery-operated pump is connected; alternatively, a sponge bath is recommended [10].

There are published records of problems reported related to chemotherapy infusion pumps. Between 2005 and 2009 the FDA received 56,000 reports on adverse events. The events involving serious injuries due to mechanical, software or programming errors. The most commonly reported incidents were due to defects of the software [11]. Problems in the software could lead to either an inoperable pump or misinterpretation of inputs. Misinterpretation can cause serious adverse events such as 10cc per hour could be registered by the device as 100 cc/h. At UHKDU out of 64 times of pump usage no reported cases of such serious adverse events. However, the reported cases of false-positive alarms were two out of 64 (0.03%).

There are reports of erroneous flow rates, sparks, charring and shock when using broken or damaged pumps [12]. Especially when there is poor Maintenance of the devices; can lead to flow rate related adverse effects. The FDA published a white paper in 2010 entitled "Infusion pump involvement initiative". The aim was to improve the quality of infusion pumps and spreading awareness amongst users in order to promote safety [13,14].

During infusion pump usage the chemotherapy staff should be well aware of preventable adverse effects such as human errors. Dose calculation and pump setup have to be double checked at all three levels; levels including Doctor, pharmacist and nurse.

Appropriate vascular access and the device should be selected by the treating consultant. The literature lacks strict guidance in this perspective. The practice, therefore, varies between peripherally using catheters and centrally placed catheters for ambulatory chemotherapy Infusion Pumps [15-17]. However Central Access Device (CAD) remains the preferred access route for chemotherapy patients. At UHKDU all patients obtained ambulatory chemotherapy *via* Port A catheter.

At UHKDU the quality of life of patients who receive FOLFOX and Cisplatin 5-FU treatment *via* AC is measuring using a validated tool. The European Organization for Research and Treatment of Cancer Quality of life Core Questionnaire (QLQ C-30). Study results are yet to be published. A similar study is done in The Christie Hospital NHS Trust, published in Journal of Oncology Pharmacy Practice in 2002 conclude as outpatient treatment was associate with better quality of life and less cost compared to inpatients treatment [18].

Since then there were many studies published to assess the quality of life and the practice-based challenges with ambulatory chemotherapy usage [19-22].

Conclusion

Most of the studies concluded ambulatory chemotherapy is a feasible alternative to the hospital stay. At current times of the COVID-19 pandemic, it is essential to ensure continuous cancer treatment while maintaining safety. With careful assessment and patient selection, ambulatory chemotherapy has the potential to cater to these needs.

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