# Patients' experience with implantable ports and peripheral lines: Experience of The Brunei Cancer Centre (TBCC)

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## ABSTRACT

**Introduction**: Chemotherapy is a treatment aimed to cure, control or palliate symptoms of cancer. Patients undergoing this treatment require several cannulations of the vein or central venous port to establish intravenous access. Accessing intravenous sites is perceived as painful and an uncomfortable procedure by patients. Patient's mobility and safety can be affected during the treatment. This research aims to describe the experiences of patients with implantable ports and peripheral line during chemotherapy in terms of pain experience, mobility, and safety. **Materials and Methods:** Using survey methods, patients undergoing chemotherapy for the period March 2012 to December 2012 were selected as respondents for this study. **Results:** Fifty patients participated in the study. Respondents reported tolerable amount of pain during these instances: insertion (72%) and removal of gripper needle or intravenous cannula (58%) and during infusion of chemotherapy (46%). In terms of mobility, fewer restrictions were encountered during chemotherapy session while taking meal (62%), moving to/from bed (78%), sleeping (74%), going to toilet (74%), reading (86%), and using the phone (90%). Generally, there is a perception of feeling safe from untoward events that might occur during the treatment and these include dislodgment of IV access (58%), leakage of chemotherapy drug to skin or surrounding tissue (64%) and acquisition of infection during IV access (72%). **Conclusion:** Patients undergoing chemotherapy had satisfactory experience as evidenced by tolerable pain experience, less restriction in physical activities during the treatment, and perceived safety from risks associated with IV or catheter dislodgment, chemotherapy leak, and infection.

**Keywords: Chemotherapy, pain perceptions, mobility limitations, safety, vascular access port**

## INTRODUCTION

Individuals diagnosed with cancer are usually given chemotherapy as a treatment. Chemotherapy itself has its own reputation of not only killing cancer cells but also the normal cells. It creates a wide range of side effects to the patients receiving it due to its toxic nature. According to the American Society of Clinical Oncology, careful administration of these drugs by oncology professionals can

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prevent soft tissue damage and potentially life-threatening consequences. Physical side effects are not the only things that make chemotherapy dreadful but also the manner of how it is administered. It is usually given in several occasions to complete the prescribed number of cycle of chemotherapy protocol. Repetitive use of peripheral veins or implantable ports to administer treatment is required. The length of time of chemotherapy infusion varies, some agents are injected slowly and some are regulated to run for an hour or more. Given this situation, patients are face with the inevitable experience of discomfort or pain, limitations on their mobility and safety during chemotherapy.

At The Brunei Cancer Centre (TBCC), an institution specialised in providing cancer care and treatment in Brunei Darussalam, conducts administration of chemotherapy in different ways, one of these is through intravenous access. Peripheral access found on hands and forearm or implantable port is usually use for chemotherapy. Experience of pain is usually associated with the insertion of needle piercing the skin to establish intravascular line whether peripherally or centrally. Often times, pain or discomfort is also encountered during the treatment itself due to the viscosity of chemotherapy agent or the regulation of infusion. Removal of cannula or needle may also induce stinging pain after completion of chemotherapy. Perception of pain varies among patients depending on their level of tolerance and familiarisation with their treatment. Aside from pain, mobility and safety are also the concerns of patients during chemotherapy. Patients' mobility may or may not be restricted during infusion of chemotherapy depending on their intended activity. Restrictions on mobility occur when a patient guard his in-placed intravenous (IV) access to dislodge accidentally. Hence, it limits their movement at some point. Safety is of prime importance enclosed in administration of chemotherapy. Any break in aseptic technique involve in chemotherapy put patients at risk to develop infection and an accidental leak of chemotherapy drug to surrounding skin or tissue may irreversible damage.

Currently, there are no existing data presenting the experiences of patients with peripheral IV access or implantable port during chemotherapy in Brunei Darussalam. This study seeks to describe patients' chemotherapy experience in terms of pain perception, mobility, and safety whether they have peripheral lines (veins in the hand or arms) or implantable port during chemotherapy. It also seeks to provide data on experiences of patients having chemotherapy to be used for future reference on the same matter. Moreover, it aims to be used as a source to formulate recommendations to improve patients' experience during the course of chemotherapy.

## MATERIALS AND METHODS

This study used the descriptive research design in identifying patients' experiences in terms of pain, mobility, and safety in relation to receiving IV chemotherapy via peripheral line and port-a-cath. Data collection was done from March 2012 to December 2012 at TBCC inpatient and day care units.

Purposive sampling was used to recruit patients who were undergoing chemotherapy at the time of the study. Patients were recruited following the criteria: a) will-

**Table 1: Type intravenous access used.**

| Type of IV Access | Frequency (%) |
|---|---|
| Implantable port | 22 (44) |
| Peripheral access | 28 (56) |
| Total | 50 (100) |

ingness to participate in the interview b) receiving intravenous chemotherapy, and c) at least on the second cycle of chemotherapy course. Patients on oral chemotherapy agents were excluded.

A self-structured questionnaire was used to determine patients' experiences on chemotherapy. The questionnaire underwent validity testing through expert validation from nursing and medical practitioners in oncology. The questionnaire measured patient's level of pain, mobility, and perception of safety through a modified Wong-Baker scale. Pain was measured using a 5-point scale (0 for "no hurt" to 5 for "hurts worst"). Mobility was measured using a 3-point scale (0 for "no restriction" to 3 for "very restricted". Perception of safety was measured through a 3-point scale (0 for "feeling safe" to 3 "very worried"). The questionnaire was translated into Bruneian Malay language and was checked for reliability by a group of Bruneian Malay staff of the hospital and pilot tested with a number of patients.

During chemotherapy session, respondents were given a copy of the questionnaire to fill out and/or assisted by the researchers in completing the questionnaire as necessary.

Questionnaires were encoded in the Microsoft Excel and analysed using the Statistical Package for Social Sciences (SPSS) software version 21 specifically to determine frequencies and percentages.

Ethical and research approval was obtained from the management of the hospital and the Medical, Health, and Ethics Research Committee (MHREC) of the Ministry of Health, Brunei Darussalam.

## RESULTS

The total number of respondents was 50. Of this number, male patients were 34% (n=17) while female patients accounted for 66% (n=33). The median age was 53.5 years old. Youngest respondent was 26 years old while the oldest was 74 years old. The age range was 48.

In terms of race, the majority of respondents (n=35) are Bruneian Malay, followed by Bruneian Chinese (n=17) and other races (n=4). As shown in Table 1, out of the 50 respondents, 44% (n=22) used implantable port, and 56% (n=28) used peripheral line

**Table 2: Chemotherapy regimes.**

| Chemotherapy Regimen | Frequency (%) |
|---|---|
| TAXOL CARBO | 9 (18) |
| XELOX | 5 (10) |
| AC | 4 (8) |
| FOLFIRI-AVASTIN | 4 (8) |
| CETUXIMAB | 3 (6) |
| FOLFOX 4 | 3 (6) |
| GEMCIS | 3 (6) |
| TAXOTERE | 3 (6) |
| FOLFIRI | 2 (4) |
| FOLFIRI-CETUXIMAB | 2 (4) |
| RCHOP | 2 (4) |
| OTHERS | 10 (20) |
| **TOTAL** | 50 (100) |

**Table 3: Pain experienced during IV cannula/gripper needle insertion and removal and chemotherapy infusion.**

| Pain Description | During IV and gripper needle insertion | During chemotherapy infusion | During IV and gripper needle removal |
|---|---|---|---|
| | Frequency (%) | Frequency (%) | Frequency (%) |
| No hurt | 8 (16) | 22 (44) | 18 (36) |
| Hurts little bit | 36 (72) | 23 (46) | 29 (58) |
| Hurts little more | 5 (10) | 2 (4) | 1 (2) |
| Hurts even more | 1 (2) | 2 (4) | 1 (2) |

in chemotherapy.

Most respondents were receiving Taxol/Carbo chemotherapy regimen (n=9), Xelox regimen (n=5), AC (n=4) regimen and FOLFIRI regimen (n=4). Table 2 shows the chemotherapy regimen received by respondents. Other regimens included ABVD, Cisplatin -Etoposide, EOX, Herceptin, Folfox 6, and GemCarbo.

Patients' experience of pain, a majority (72%) reported mild (hurt little bit) during insertion of IV cannula and gripper needle. Pain during chemotherapy infusion, majority reported either no (44%) or mild pain (46%. During IV cannula or gripper needle removal, again the majority reported either no pain (36%) or mild pain (58%) Table 3 shows the pain experience of respondents during insertion and removal of IV access, and chemotherapy infusion.

In terms of mobility, activities routinely (taking meals, moving up and down the bed/chair, sleeping, going to the toilet, reading, and using the phone) done by the patients during their chemotherapy treatment, most felt no restrictions. Few mentioned feeling less restricted in doing these activities while their chemotherapy drugs were being infused. This is shown in Table 4.

With regards to their perceptions of safety during their chemotherapy, most respondents reported feeling safe with regards to port or IV dislodgement, chemotherapy drug leakage, and infection acquired during IV or port access (Table 5).

## DISCUSSION

IV access is important but initiating an IV access whether through a peripheral vein or use of port-a-cath may result in pain to the patients. Pain during the establishment of IV

**Table 4: Patient's mobility while on chemotherapy: taking meals, moving up and down the bed or chair, sleeping.**

| Activities | Taking Meal | Moving up and down the bed/chair | Sleeping | Going to toilet | Reading | Using the phone |
|---|---|---|---|---|---|---|
| Degree of Mobility | Frequency (%) | Frequency (%) | Frequency (%) | Frequency (%) | Frequency (%) | Frequency (%) |
| No restriction | 31 (62) | 39 (78) | 37 (74) | 37 (74) | 43 (86) | 45 (90) |
| Little restriction | 18 (36) | 10 (20) | 11 (22) | 10 (20) | 5 (10) | 5 (10) |
| Very restricted | 1 (2) | 1 (2) | 2 (4) | 3 (6) | 2 (4) | 0 (0) |

**Table 5: Perception on the Safety of IV access during chemotherapy.**

| Perception of Safety | Dislodgement of port/IV access when patient is moving | Chemotherapy drug leakage to the skin/other body parts | Possible infection that maybe acquired during IV/port access by the nurse |
|---|---|---|---|
| | Frequency (%) | Frequency (%) | Frequency (%) |
| Feel safe | 29 (58) | 32 (64) | 36 (72) |
| Slightly worried | 12 (24) | 9 (18) | 4 (8) |
| Very Worried | 1 (2) | 1 (2) | 2 (4) |
| No answer | 8 (16) | 8 (16) | 8 (16) |
| Total | 50 (100) | 50 (100) | 50 (100) |

access is mainly due to needle prick to the skin. Patients with cancer often mention needle procedures as the most fearful, distressing, and painful experiences with regard to disease and treatment. [2] Patient discourses suggest that chemotherapy-related needle anxiety is a result of physical (e.g. finding a suitable vein) and environmental (e.g. chemotherapy room) factors. [3] Pain inflicted at the start of treatment may have an effect on their overall experience during chemotherapy. [4]

Patients undergoing chemotherapy typically require several cycles of treatment and with repeated use, the peripheral veins may be damaged. This can result in difficult and failed cannulations in the course of treatment. As such some patients even prefer oral chemotherapy to systemic IV infusion mainly due to inconvenience associated with problems with IV access or needles. [6] An alternative to peripheral line, is the use of implanted port. In TBCC, 22 gauge IV cannula is primarily used to establish peripheral line access for chemotherapy use while gauge 20 ¾ inch gripper needle is utilised to access implanted port. Respondents in the study revealed that they generally experienced mild level of pain as a result of establishing IV access (Table 3). However, it is important to reduce even though the pain experienced is mild. Other means of lessening pain experience during IV access are also utilised in the centre and these include the use of EMLA cream and encouraging deep breathing exercise for patients with needle anxiety and low pain threshold.

Pain experienced during chemotherapy is also related to the actual infusion of chemotherapy drugs. Some chemotherapy drugs are irritants which can cause inflammatory, aching, swelling, pain or phlebitis at the injection site or along the vein. A number of cytotoxic drugs are classified as vesicants and can cause severe and lasting tissue injury and necrosis. Among the chemotherapy regimen received by respondents, Taxol-Carbo (Paclitaxel-Carboplatin), Xelox (Oxaliplatin), AC (Cyclosphosphamide) are irritants while Adriamycin and Cisplatin (in concentration of $\geq$0.5 mg/ml) are considered vesicants. [5] Respondents in this study generally reported experience no to mild pain chemotherapy drugs were administered and during IV access removal regardless of whether peripheral line or port-a-cath access, similar to findings by Spagrud *et al*. [7]

During chemotherapy, patients are connected to infusion sets and these may hinder patients' physical mobility and often encounter functional status limitations. [8] This

along with their physical impairments may limit their independence. [8] For peripheral IV access, the ideal IV access should be situated on the distal part of the arm (but proximal to any previous attempt) [9] and ideally the non-dominant hand and without contraindications (i.e. AV fistula or post-mastectomy site). [9] Use of port-a-cath has many advantages as it allows the patient unrestricted mobility, greater freedom in choice of activities, and enables more comfortable administration of drugs. [10, 11] Respondents in our study, however, reported no significant restrictions in their physical movement and in carrying out activities during the chemotherapy infusion whether using peripheral IV or port accesses.

Apart from issues of pain and mobility associated with chemotherapy, chemotherapy drugs is associated with risks. Chemotherapy leak may occur due improper placement of the IV access to improper secure to the implantable port/iv access. This can result damage to the vein. Antineoplastic agents infusion through peripheral lines are more likely to be associated with adverse events including extravasation, which can lead to mild to severe tissue injuries. [13, 14] Infection related to establishing IV or accessing the port can also pose a risk brought by non-compliance to aseptic techniques. Infection rate of 13% (n=41 patients) with an overall incidence rate of 0.76/1,000 catheter-days have been reported in one study. [15] Another study reported that infection was the most common complication, accounting for nine of 18 Hickman line complications and five of six Port-a-Cath complications, giving an overall infection rate of 2.54/1000 catheter days and 0.86/1000 catheter days, respectively. [16] Despite the associated infection linked with the use of ports in chemotherapy, several studies have concluded that continuous infusion of chemotherapy is a relatively safe procedure. [15-19]

Our study showed that patients undergoing chemotherapy session have relatively satisfactory experience as evidenced by tolerable pain experience, less restriction in physical activities, and perceived safety from risks associated with IV or catheter dislodgment, chemotherapy leak and extravasation, and infection related to IV or port access. We recommends regular monitoring of patient's experiences in chemotherapy administration through the use of customer feedback form, patient and family interview, conduct of regular skills audit, and continuing education as opportunities to further improve quality of care and patient's experience. Future studies can focus on pain management strategies during chemotherapy, mobility and functional status of patients and incidences of extravasation and catheter-related infections.

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