A Questionnaire-based Assessment of the Anxiety, Satisfaction and Discomfort Experienced by Japanese Cancer Patients during the Use of Central Venous Ports

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Abstract

Objective A significant number of Japanese cancer patients refuse to have central venous (CV) ports implanted. The aim of this study is to investigate the experiences of patients prior to and after CV port implantation, as well as their expectations regarding the use of CV ports.

Methods This study was carried out at Osaka Medical Center for Cancer and Cardiovascular Diseases from October 20, 2014, to January 16, 2015. Data were collected using a questionnaire developed by the researchers, and various statistical analyses were performed.

Results Among the 50 patients who participated in this study, the CV port was implanted due to poor venous access in 18 (36%). The proportion of patients who were anxious before the port implantation was significantly higher among the patients in whom CV ports were implanted due to poor venous access than among those in whom CV ports were implanted for other reasons. All patients exhibited high satisfaction levels, regardless of the reason for CV port implantation. CV port-related discomfort was most commonly associated with seat belts.

Conclusion The patients exhibited high satisfaction levels regardless of the reason for CV port implantation. However, the patients that exhibited poor venous access often experienced anxiety before the implantation of the port, so it is important to provide such patients with sufficient information prior to port implantation. In order to improve the quality of life of patients with CV ports, medical staff should give special consideration to discomfort experienced by patients that are wearing seat belts.

Key words: central venous port system, anxiety, seat belt

(Intern Med 55: 2393-2399, 2016)
(DOI: 10.2169/internalmedicine.55.6032)

Introduction

Recently, the use of central venous port (CV port) systems has increased rapidly around the world because of their convenience and safety for patients who require long-term continuous intravenous therapy and those in whom venous access is difficult. In Japan, an advanced medical center reported that CV port systems are frequently used during chemotherapy (1); however, a significant number of Japanese patients refuse to have CV ports implanted for various (often vague) reasons, such as an excessive fear of complications or an aversion to implanted artificial devices. In cancer patients that exhibit poor venous access, refusal to undergo port implantation can result in the discontinuation of chemotherapy, and in the worst-case scenario can lead to peripheral vasculitis or the extravasation of anti-cancer drugs.

In our hospital, many patients who were urged to have CV ports implanted for clinical reasons hesitated to undergo implantation. However, after port implantation, most such patients reported high satisfaction and hoped that their CV ports might be multi-purpose. Given these findings, we realized the necessity of providing new patients with precise information obtained directly from previous patients about CV

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Received for publication June 25, 2015; Accepted for publication January 5, 2016
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ports. We therefore administered this questionnaire and mainly investigated the anxieties experienced by patients prior to implantation of CV port systems as well as 1) reasons for CV port implantation, 2) satisfaction of patients with their CV ports, 3) complications associated with CV ports, 4) discomfort caused by CV ports, and 5) patients’ expectations regarding the utility of CV ports.

Materials and Methods

Subjects and procedures

This study was carried out from October 20, 2014 to January 16, 2015 at the cancer chemotherapy center for outpatients of Osaka Medical Center for Cancer and Cardiovascular Diseases. All patients who received chemotherapy via their CV port systems during this period were included in the study. The patients were informed about the aims of the study in the room for chemotherapy of outpatients. The interviewers were nurses at the chemotherapy center who were not members of the CV port managing team. If they agreed to participate in the study, they were given a questionnaire, which had been developed by the authors, and the completed questionnaire was collected during the next chemotherapy session. In our hospital, we defined a patient who had a history of peripheral vasculitis or extravasation of anti-cancer drugs, or who required venepuncture more than three times to obtain a stable intravenous route, as a patient with poor venous access. All of the participants signed written consent forms prior to their participation.

Questionnaire

The questionnaire was developed by the researchers (Table 1). It included questions about gender, age group, the number of port implantation procedures that the patient had undergone, the setting in which the port was implanted (inpatient or outpatient), the reasons for port implantation, the patient’s satisfaction with the CV port, discomfort associated with the CV port, the patient’s opinion about the advantages of CV ports, any anxiety experienced by the patient before port implantation, the patient’s expectations regarding the use of the CV port system, complications, and the mean number of venipuncture procedures performed prior to port implantation. The questionnaire was unsigned.

Statistical analysis

All statistical analyses were performed using the STATA software program version 12. Descriptive statistics were used to characterize the patient population. The significance of differences between groups (patients in whom CV ports had been implanted due to poor venous access versus those in whom CV ports had been implanted for other reasons) was determined using Fisher’s exact test for categorical variables and Student’s t-test for continuous variables. Two-tailed tests of significance were used. In all analyses, p<0.05 was considered to be significant.

Ethical approval

This study was approved by the ethics committee of Osaka Medical Center for Cancer and Cardiovascular Diseases.

Results

Seventy-five patients were contacted during the study period, and 50 (66%) of them agreed to participate in this study. Table 2 shows the patients’ characteristics. More than 70% of the patients were over 60 years of age, and 17 (34%) of them were women. CV ports were implanted due to poor venous access and to facilitate long-term intravenous injections in 18 (36%) and 24 (48%) patients, respectively. In addition, 8 (16%) patients underwent port implantation for other reasons, such as clinical trials. Forty-nine (98%) patients were undergoing their initial port implantation procedure, and 1 patient was undergoing their second port implantation procedure. In addition, 36 (72%) and 14 (28%) patients had CV ports implanted as inpatients and outpatients, respectively.

Regarding the patients’ overall satisfaction, 74% were satisfied with their CV ports, and 22% were somewhat satisfied with their CV ports, but had suffered some discomfort. None of the patients regretted having the CV port implanted. Interestingly, 7 (39%) of the 18 patients in whom CV ports were implanted due to poor venous access stated that they wished that they had undergone the procedure earlier (Figure). The patients were asked to indicate the degree of their satisfaction with the CV port on a visual analog scale ranging from 0% (complete dissatisfaction) to 100% (complete satisfaction). Mean scores for all patients, those in whom CV ports had been implanted due to poor venous access, and those in whom CV ports had been implanted for other reasons were 86.2%, 90.2%, and 83.9%, respectively. There was no significant difference in the satisfaction levels between patients in whom CV ports had been implanted due to poor venous access and those in whom CV ports had been implanted for other reasons (p=0.119) (Table 3).

Table 4 shows the patients’ opinions regarding the advantages of CV port systems. The most frequently expressed opinion (70%) was that the patients no longer had to worry about the positions of their arms during intravenous injections. The second most commonly stated opinion (68%) was that multiple venipuncture procedures were no longer necessary.

Types of CV port-related discomfort reported by two or more patients are listed in Table 5. Difficulty in fastening seat belts (6%) was the most commonly reported type of CV-related discomfort. Two patients (4%) each complained of discomfort in the bath, and stiff shoulders/shoulder pain. In addition, the following types of discomfort were experienced by one patient each: tenderness around the CV port, restricted arm rotation, pain during the implantation of the port, anxiety, subcutaneous bleeding after port implantation,
Table 1. Questionnaire Used in This Study.

Please answer the following questions to aid our clinical research into the use of CV ports in chemotherapy.

(Question 1)
1. What is your gender? 2. Which age group do you belong to? 3. How many times have CV ports been implanted in your body?
   1) Male, 2) Female
   2) 1) <20-year-old, 2) 20-39, 3) 40-59, 4) 60-79, 5) ≥80
   3) 1) Once, 2) Twice, 3) Three or more times

(Question 2)
When your CV port was implanted, were you an inpatient or outpatient?
1) Inpatient, 2) Outpatient

(Question 3)
Why was your CV port implanted?
A) Because my veins were fine and weak, which made it hard for me receive intravenous drip infusions.
B) Because I needed long-term continuous intravenous therapy.
C) Other reasons

(Question 4)
Overall, how satisfied are you with the CV port system?
1) I am very satisfied with the port system and wish it had been implanted earlier. (Do not select this, if you selected option B for Question 3)
2) I am satisfied with the CV port system.
3) I am somewhat satisfied with the CV port system, but have experienced some discomfort.
4) I regret that the CV port system was implanted.

(Question 5)
If you chose option 3) or 4) for Question 4, please describe the discomfort you have experienced.

(Question 6)
If complete satisfaction is defined as 100%, and complete dissatisfaction is defined as 0%, how satisfied are you with the CV port system?
   ( %)

(Question 7)
Please select the advantages of CV ports that apply to you (you can select more than one answer).
1) I no longer have to undergo multiple venipuncture procedures.
2) I experience less pain when procedures are performed via the CV port rather than via my peripheral veins.
3) I do not have to adjust the positions of my arms during intravenous injections.
4) The CV port does not cause me much discomfort in my daily life.
5) Other reasons ( )

(Question 8)
If you chose option A) for Question 3, how many times a day were your veins usually punctured for the purpose of blood examinations or chemotherapy before your CV port was implanted?

(Question 9)
Did you feel any anxiety about the CV port system before its implantation?
1) I did not feel any anxiety.
2) I felt some anxiety.

(Question 10)
If you chose option 2) for Question 9, what was the source of your anxiety? (you can select more than one answer)
1) There was no clear reason, but I felt a vague sense of anxiety.
2) I received insufficient information about the CV port system from the medical staff.
3) I was afraid of complications.
   (Please describe what kind of complications you were afraid of: )
4) Being admitted to hospital for CV port implantation was inconvenient for me.
5) I was afraid of cosmetic deformities.
6) I was afraid that the CV port might have caused me discomfort in my daily life.
7) I did not trust the medical staff.
8) I was uncomfortable with the idea of having an artificial device in my body.
9) Other types of anxiety ( )

(Question 11)
Have you ever suffered from any complications associated with the CV port system?
1) Port system occlusion, 2) Infection, 3) Kinking or dislocation
4) Other complications ( )

(Question 12)
What types of procedures do you want the CV port system to be used for? (you can select more than one answer)
1) For intravenous injections only
2) To obtain blood samples for laboratory examinations
3) To inject contrast agents during CT or MRI scans

(Question 13)
If you have any opinions about the CV port system, please describe them.

anxiety during muscle training, restricted movement whilst in the prone position, an unusual sensation associated with the CV port, and CV port infection. Complications; i.e. related infections, were only reported
by one subject. However, three other complications actually occurred during the study period (infection of the CV port site, fibrin sheath formation, and catheter dislocation). Ten patients suffered anxiety prior to the implantation of the CV port, seven of whom underwent CV port implantation due to poor venous access. With regard to the number of patients who experienced anxiety prior to the implantation of the CV port, a significant difference in the frequency of anxiety was detected between the patients that underwent CV port implantation due to poor venous access and those that underwent the procedure for other reasons (p=0.024) (Table 6). The details of the anxiety experienced by the patients are shown in Table 7. Vague anxiety with no clear cause and an aversion to implanted artificial devices were the most common types of anxiety experienced by the patients (60% of patients that experienced anxiety listed these factors as causes).

As for the patients’ expectations regarding the use of CV ports, 34% of patients hoped that the CV ports could be used to collect blood samples for laboratory examinations. The proportion of patients that expressed this sentiment was significantly higher among the patients in whom CV ports had been implanted due to poor venous access than among those in whom CV ports had been implanted for other reasons (p<0.0001) (Table 8). The proportion of patients that hoped that their CV ports would be used during contrast-
Table 4. Patients’ Opinions Regarding the Advantages of CV Ports.

<table>
<thead>
<tr>
<th>Advantage</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple venipuncture procedures are no longer required</td>
<td>34 (68)</td>
</tr>
<tr>
<td>Patients experience less pain when procedures are performed via the CV port rather than via their peripheral veins</td>
<td>21 (42)</td>
</tr>
<tr>
<td>Patients do not have to adjust the positions of their arms during intravenous injections</td>
<td>35 (70)</td>
</tr>
<tr>
<td>The CV port causes patients little discomfort in their daily lives</td>
<td>28 (56)</td>
</tr>
<tr>
<td>Other reasons</td>
<td>2 (4)</td>
</tr>
</tbody>
</table>

Table 5. Types of Discomfort Associated with the Use of CV Ports.

<table>
<thead>
<tr>
<th>Type of discomfort</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulty in fastening a seatbelt</td>
<td>3 (6)</td>
</tr>
<tr>
<td>Discomfort in the bath</td>
<td>2 (4)</td>
</tr>
<tr>
<td>Stiff shoulder, shoulder pain</td>
<td>2 (4)</td>
</tr>
</tbody>
</table>

The following types of discomfort were only experienced by one patient each: tenderness around the CV port, restricted arm rotation, pain during the implantation of the CV port, anxiety, subcutaneous bleeding after the implantation of the CV port, anxiety during muscle training, restricted movement in the prone position, an unusual sensation associated with the CV port, infection of the CV port.

Table 6. Frequency of Pre-implantation Anxiety.

<table>
<thead>
<tr>
<th>Reason for port implantation</th>
<th>Poor venous access</th>
<th>Other reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did you suffer anxiety before the implantation of the CV port?</td>
<td>Yes 7</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>No 11</td>
<td>29</td>
</tr>
</tbody>
</table>

p value p=0.024

Table 7. Sources of Anxiety.

<table>
<thead>
<tr>
<th>Source of anxiety</th>
<th>N  %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vague anxiety with no clear cause</td>
<td>6  60</td>
</tr>
<tr>
<td>Insufficient information about the CV port</td>
<td>1   10</td>
</tr>
<tr>
<td>Possibility of complications</td>
<td>2   20</td>
</tr>
<tr>
<td>The inconvenience of being admitted to hospital</td>
<td>1   10</td>
</tr>
<tr>
<td>Cosmetic deformities</td>
<td>1   10</td>
</tr>
<tr>
<td>Disturbances to daily life</td>
<td>5   50</td>
</tr>
<tr>
<td>Aversion to the implantation of artificial devices</td>
<td>6   60</td>
</tr>
</tbody>
</table>

enhanced imaging examinations was higher among patients that demonstrated poor venous access than among those in whom CV ports had been inserted for other reasons, but the difference was not significant (p=0.089).

Discussion

Recently, the use of CV port systems has increased rapidly in Western countries. However, in Japan many patients are reluctant to undergo CV port implantation for various (often vague) reasons. The emotional characteristics of Japanese patients, such as their aversion to implanted artificial devices and excessive fear of complications, seem to be a barrier to the use of CV port systems. In fact, at our hospital’s cancer chemotherapy center for outpatients only 14% of chemotherapy sessions are performed via CV port systems. From August 2014 to March 2015 we designated 11 outpatients in whom peripheral vein access was extremely difficult as “not suitable for peripheral vein access” and strongly recommended that they have CV ports implanted.
Table 8. Patients’ Expectations Regarding the Use of CV Ports.

<table>
<thead>
<tr>
<th>Reason for port implantation</th>
<th>Poor venous access</th>
<th>Other reasons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of patients: 18</td>
<td>Total number of patients: 32</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Yes 12</td>
<td>No 6</td>
</tr>
<tr>
<td>Do you hope that your CV port will be used to withdraw blood?</td>
<td>5</td>
<td>27</td>
</tr>
<tr>
<td>p value</td>
<td>p&lt;0.0001</td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Yes 7</td>
<td>No 11</td>
</tr>
<tr>
<td>Do you hope that your CV port will be used during contrast-enhanced imaging examinations?</td>
<td>5</td>
<td>27</td>
</tr>
<tr>
<td>p value</td>
<td>p=0.089</td>
<td></td>
</tr>
</tbody>
</table>

However, 6 of them refused to have CV ports implanted.

In the present study, as we expected, vague anxiety with no clear cause and an aversion to implanted artificial devices were the most common types of anxiety experienced prior to port implantation. The patients in whom CV ports had been implanted due to poor venous access were significantly more likely to suffer anxiety prior to port implantation than the patients in whom CV ports had been implanted for other reasons. Regardless of the reason for CV port implantation, most patients (74%) were satisfied with the CV ports after their implantation, although the proportion of satisfied patients was slightly lower than those described in previous reports from Europe (2, 3). Satisfaction was assessed using a visual analog scale. The patients that exhibited poor venous access tended to feel more satisfied with their CV ports than those in whom CV ports had been implanted for other reasons, but the difference was not significant. Considering this, patients in whom peripheral venous access is difficult, such as patients with breast cancer, obese patients, and elderly patients, CV ports should be installed at an early stage of treatment. In the present study, 29 patients (58%) underwent port implantation in our hospital, while the remaining patients underwent implantation in other hospitals. In our hospital, CV ports were implanted by an expert interventional radiologist who had three years’ experience with CV port implantation and who implanted more than 100 CV ports annually. Although operator’s skill at other hospitals was unknown, there was no significant difference in satisfaction on a visual analog scale between patients who had CV ports implanted in our hospital and those who had their ports implanted in other hospitals (p=0.70; data not shown).

As for the patients’ opinions regarding the advantages of CV ports, the most commonly reported advantages were that they no longer had to worry about the positions of their arms during chemotherapy and that they no longer had to undergo multiple venipuncture procedures. These findings suggest that many patients suffer stress when they are placed in the restricted antebrachial position during chemotherapy. Furthermore, in the present study, the mean number of venipuncture procedures performed each day before the CV port implantation was 3.6 in patients with poor venous access. Therefore, the reduction in the number of venipuncture procedures brought about by the use of CV ports might lead to improvements in patients’ quality of life.

The subjects reported various kinds of CV port-related discomfort. The most common type of CV port-related discomfort was difficulty in fastening a seat belt. As far as we know, no previous reports have described such difficulties. However, pacemakers have been reported to be associated with seat belt-related complications (4), and Sakakibara et al. found that the interaction between seat belts and pacemakers lowers the frequency of seat belt use in patients with pacemakers (5). Medical staff and CV port manufacturers should give special consideration to the discomfort CV ports can cause during seat belt wearing.

Infections and occlusive/thrombotic complications are critical problems affecting the long-term usage of CV ports; however, their incidence rates are generally not very high (3, 6). Indeed, in the present study, complications were only reported by one participant, although three other complications actually occurred during the study period. Furthermore, some Japanese reports have detected relatively high rates of complications associated with CV port use (7, 8). Thus, expert management is necessary to ensure the safe and long-term use of CV ports. At our hospital, prior to this study, all blood samples were obtained from patients’ peripheral veins. However, the present study showed that many patients, especially those in whom peripheral venous access was difficult, hoped that their CV ports would be used to collect blood samples. Based on these results, we have started collecting blood samples from CV ports at our hospital.
There were a number of limitations to this study. First, our study sample size was insufficient to derive a common opinion on CV port systems among Japanese cancer patients. This study was carried out only in our hospital, and while all patients who received chemotherapy via their CV port systems were contacted in the study, only 50 agreed to participate. This number of patients had not been calculated statistically beforehand. Second, the interviewers were nurses at our center. In such situations, patients tend to provide favorable opinions on CV port systems. Consequently, the satisfaction level reported in this study may have been higher than the true impression of the patients. Third, we did not ask the patients for background information on malignancies and performance status in this questionnaire; such imbalance in these factors may have influenced the satisfaction and anxiety of the patients. Last, we drafted our original questionnaire in Japanese and then translated it into English for this paper, and we therefore cannot entirely discount possible errors in translation.

Conclusion

The patients in the present study were highly satisfied with their CV ports, regardless of the reasons for their implantation. However, patients with poor venous access often suffer from anxiety prior to CV port implantation, so it is important to provide patients with sufficient information about CV ports before their implantation. In order to improve the quality of life of patients with CV ports, medical staff and CV port manufacturers should give special consideration to the discomfort that CV ports can cause, especially when wearing seat belts.

The authors state that they have no Conflict of Interest (COI).

References