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Port Needles

Do They Need to be Removed as Frequently in Infusional Chemotherapy?

Abstract

Protracted chemotherapy regimens are new treatment modalities used to treat patients with cancer. These treatments are preferred because of the ease of administration and limited side effects in the outpatient setting. Sixty patients were treated with continuous infusion chemotherapy via implanted infusion ports at Marmara University Hospital Outpatient Chemotherapy Unit in Istanbul, Turkey, from January 2000 to December 2001. Although usage of Huber needles for central venous catheters was limited to between 48 and 72 hours, needles were not removed unless there were signs of inflammatory reaction. The needles remained in place for 28 days (1-49 days) on average. No catheter infections, signs of local irritation, or thrombus formation were observed despite prolonged stay of the Huber needles. Huber needles can be left in place up to several weeks without any untoward effects as long as proper aseptic technique is used.

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Among the main objectives of contemporary oncology is providing comfort to patients during administration of chemotherapy. The development of central venous access devices and pumps makes it possible to use continuous infusion chemotherapy for months.[1,2] Central venous port implantation is a simple procedure and provides patients with safe and reliable vascular access.

Although central venous catheters are known and used in Turkey, they do not have wide acceptance outside of a few oncology centers in major metropolitan cities like Istanbul, Ankara, and Izmir, which serve almost 50% of all patients. The use of continuous infusion chemotherapy has become a common practice in the medical oncology department of Marmara University Hospital, Istanbul, since 2000. In the majority of patients, 5-fluorouracil has been used in continuous infusions with success. The idea of prolonged infusion with 5-fluorouracil is attractive because it permits higher doses, increases antitumor efficacy in some instances, and decreases host toxicity of the drug.

Our hospital routinely used the Huber needles for implanted port system access. Huber needles were used for 5 to 7 days at standard recommendations, but no data exists regarding how long they can be left in situ without change. We wanted to evaluate the feasibility of leaving the needle in situ for longer than 7 days without increased complications.

• MATERIALS AND METHODS

Sixty patients were treated with continuous infusion chemotherapy by way of implanted infusion ports at the outpatient chemotherapy unit of Marmara University Hospital between January 2000 and December 2001 (Table 1). Three different port systems were used for continuous infusion chemotherapy. All port system sizes were 8.5 French. The ports used were the Port-A-Cath (SIMS Deltec Inc., St. Paul, Minn), which consists of a stainless steel chamber covered by a silicone membrane connected to a silicone catheter placed in a central vein; the BardPort (Bard Inc., Salt Lake City, Utah) constructed of titanium and silicone rubber connected to an 8 F silastic Groshong catheter tubing; and Celsite (B. Braun Medical SA, Boulogne-Billancourt Cedex, France), composed of a titanium chamber and epoxy coating connected to a silicone catheter (Figure 1).

A team of two thoracic surgeons and one anesthesiologist in the operating room inserted the ports under local anesthesia. A thoracic surgeon must place at least 20 ports with the aid of an expert before performing this procedure alone. The catheter and port chamber were flushed with 2500 units of heparin diluted in 5 mL normal saline before implantation. Each patient was in a supine position and 5 mL articain hydrochloride 2% was applied to the skin. The catheter needle was introduced percutaneously into the subclavian vein with the aid of a guide wire, which was controlled with a portable fluoroscope (C-arm). Later, a catheter dilator was introduced into the vein and the guide wire was pulled back. After this, a subcutaneous pocket was created approximately 3 cm below the clavicle. The port chamber was fixed with 2-0 Vicryl suture by two sides to the underlying fascia. The proximal end of the catheter was passed through subcutaneous tissue with the aid of a tunneler and connected to the port chamber. The system was flushed with 10 mL of normal saline and 2500 units of heparin to check for patency. Immediately after port insertion, cleaning and dressing of the port site was done according to standard procedures, described below. After implantation, a chest x-ray was obtained immediately to confirm proper positioning. No patient was maintained on oral anticoagulants during the life of the port. None of the ports was sent for culture after removal unless there were any signs of infection.

TABLE 1

Patient Characteristics

	Number of Patients (%)
Sex	
Male	29 (48)
Female	31 (52)
Disease site	
Lung	2 (3.3)
Gastrointestinal	48 (80)
Breast	3 (5)
Urogenital	2 (3.3)
Head and neck	4 (6.6)
Primary unknown	1 (1.6)
Duration of infusion, days	
< 7	9 (15)
8-14	0 (0)
15-21	5 (8.3)
22-49	38 (63.3)
> 50	8 (13.3)

Port Care

Oncology nurses performed care and maintenance of the implanted ports. These nurses are deemed capable of caring for implanted ports after a 6-month education program at the hospital, which consists of continuous infusion chemotherapy, adverse effects of chemother-

FIGURE **1.**
Central venous port—Celsite (B. Braun Medical SA, Boulogne-Billancourt Cedex, France).

apy, central venous access devices and needles. Oncology nurses inserted Huber needles (Cytocan, B. Braun Medical, Boulogne, France, 20 gauge × 15 or 20 mm Luer Lock) in the oncology unit under sterile conditions (Figure 2). Initially, patients were observed for adverse cutaneous reactions. The port was stabilized with the index finger and thumb of the nondominant hand, and the septum of the port was palpated with the opposite hand. Port entrance site care was provided by cleaning skin around the Huber needle four times with 10% povidone-iodine solution (Adeka, Samsun, Turkey) and sterile gauze, starting from the center of the entrance site and working toward the outside.

Using aseptic technique, the extension tubing and Huber needle were filled with saline, expelling all air. The port was stabilized and the Huber needle was accessed at a 90° angle. After checking blood return, the implanted port was flushed with 2500 units of heparin diluted in 5 mL of normal saline. Then sterile 4 × 4-inch gauze was placed under the needle to prevent direct contact of the needle with the skin and was then covered with a 10 × 10 hypoallergenic tape Hypofix (BSM Medical, GmbH & Co. KG., Hamburg, Germany). This procedure was repeated after each use in patients treated with continuous infusion chemotherapy and once monthly in patients whose ports were used infrequently.

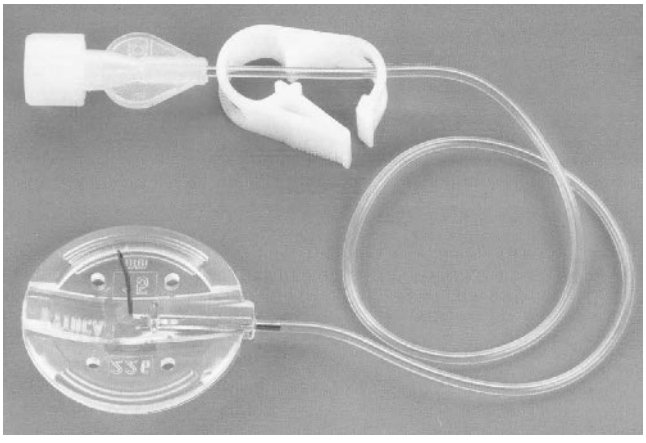

FIGURE **2.**
Huber needle—Cytocan (B. Braun Medical, Boulogne, France).

Patients were observed for adverse cutaneous reactions at the insertion site. Needles were not removed unless there was any sign of inflammatory reaction. Before removing the needle, the port was also flushed with 2500 units of heparin diluted in 5 mL of normal saline and dressed as described above. Patients were instructed to take off the dressing 24 hours later. Port side (Huber needle entrance site of port) was observed on each visit for chemotherapy during treatment (every 7-21 days) and each month thereafter. During these monthly follow up visits, port care was done as described above.

Drugs and Route of Administration

All implanted ports were used for administration of chemotherapy in this study. Patients received protracted infusions of 5-fluorouracil with various intermittent bolus cytostatic agents (irinotecan, epirubicin, carboplatin, cisplatin, navelbine, and gemcitabine). Continuous infusions were administered at a rate of 0.5 mL/hour, 2 mL/hour, and 4 mL/hour with a multiday Baxter (Baxter-Travenol Pharmaceuticals, Inc., Deerfield, Ill), Braun (B. Braun, Melsungen, Germany) or Paragon (I-Flow Corporation, Lake Forest, Calif) infusers. These infusers were changed every 1, 5, 7, and 12 days, depending on patients' treatment schedules. Continuous infusion treatments were given using infusers changed every 12 days. Patients received one to eight cycles of treatment, depending on their diagnosis.

• RESULTS

A total of 60 ports were implanted into 60 patients. Forty-eight percent of patients were female. The mean age was 59 (range, 22 - 80 years). All patients had solid tumors. Gastrointestinal carcinomas comprised 80% of the patients in this study. The rest of the group had head and neck carcinomas (6.6%), breast carcinomas (5%), lung carcinomas (3.3%), urogenital carcinomas (3.3%), and unknown primary carcinomas (1.6%).

Continuous infusion chemotherapy was administered to five categories of patients:

1. Less than 7 days (9 patients)
2. 8 to14 days (0 patients)

3. 15 to 21 days (5 patients)
4. 22 to 49 days (38 patients)
5. More than 50 days (8 patients)

No incidents of catheter infections, signs of local irritation, catheter migration, bleeding, thrombus or needle dislodgment were observed despite prolonged stay of the Huber needles. On average, needles stayed on implanted ports for 28 days (range, 1 - 49 days).

• DISCUSSION

Continuous intravenous infusion therapy is becoming widely used in the world for various kinds of cancer treatment. Central vascular access devices help patients avoid anxiety related to repeated venipuncture, and provide a better quality of life. Huber needles are the standard way to access port systems, but it is not certain how long they can be left in situ without change. We wanted to evaluate the use of Huber needles for longer than the recommended time frame.

Our study showed that these needles can be used for an average of 28 days without increased complications when used under sterile conditions by experienced oncology nurses. The manufacturer recommends replacement of needles every 5 to 7 days. However, little data exists in the literature about how frequently they should be changed. But there is a consensus in previous trials that we do not need to replace them so frequently. Milani et al[1] studied 129 patients and left Huber needles in situ for 21 days until a new cycle of chemotherapy was started. They reported that only 3.8% of their patients had local cutaneous sores. In another study, Brown[3] used a polymer catheter port access device in 54 patients and only two patients experienced blood stream infections. The mean duration of access was 19.4 days. Furthermore, in a different trial from Spain dealing with the safety of ambulatory continuous infusion chemotherapy administration, the Huber needle was changed on the 10th to 14th days, or as needed.[2] No complications related to the Huber needles or implanted port devices were reported.

Endurance of the port septum increases with fewer puncture to portal systems. Muller et al found occlusion by silicone chips deriving from silicone inlet septum to be a major technical complication. Electron microscopic investigations demonstrated substantial loss of material from the port membrane after repeated puncture.[4]

Because all drug administrations were done in our outpatient clinic, no clinical complications related to needle insertion were observed. In a study reported by Brown, three patients among 32 patients who received chemotherapy at home required port removal for complications.[5] We recommend that central venous ports be handled with aseptic technique by trained nurses.

Although there are publications dealing with complications of infusion systems, limited data about Huber needles exist. Therefore, this article has aimed to emphasize the importance of this issue.

• CONCLUSION

Huber needles can be left in place up to several weeks without any untoward effect as long as proper aseptic technique is used. This procedure helps patients avoid stress and anxiety related to needle insertion. Portal septum life could be extended by fewer access exposures, and infrequent changing of the Huber needles may be important for countries that have limited healthcare supplies. The optimal time frame for leaving Huber needles in place should be studied further with randomized controlled trials.

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