

Effect of Venous Port Implantation Under Interscalene Block on Patient Satisfaction and Quality of Analgesia

Mehmet Uğur Turhan  ▪ Mustafa Kaçmaz  ▪ Veyssel Erden 

¹ Department of Anesthesiology and Reanimation, Niğde Training and Research Hospital, Niğde, Turkey

² Department of Anesthesiology and Reanimation, Ömer Halisdemir University, Niğde, Turkey

³ Department of Anesthesiology and Reanimation, İstanbul Training and Research Hospital, İstanbul, Turkey

Introduction: This study aimed to evaluate the patient's comfort, VAS (visual analogue scale) and the complications by performing subclavian venous port implantation under interscalene block.

Materials and Methods: 40 patients who underwent venous port implantation under interscalene block in Pain Unit were prospectively analysed. When a response from deltoid muscle contraction at a current of 0.5 mA was obtained in patients by using peripheral nerve block needle due to interscalene block, 10 mL of levobupivacaine 0.25%+10 mL of lidocaine 1%+10 mL of prilocaine 1% was administered. The satisfaction scores 2 hours after the procedure were evaluated and recorded.

Results: When satisfaction levels of our patients were evaluated, there was no patient who was completely dissatisfied with the procedure. The rate of the patients who were completely satisfied 2 hours after the procedure was 55% and the rate after 24 hours was 27.5%. The mean VAS value in our patients in the study group was evaluated as 2.6 ± 1.32 . This value did not require additional analgesia and did not affect the level of satisfaction in our patients.

Conclusion: In the procedure of venous port implantation, effective analgesia and high level of patient satisfaction were achieved with interscalene block administration. Interscalene block can be used as an alternative method for venous port implantation under appropriate conditions.

Keywords: Venous port, interscalene, block, analgesia

Introduction

Interscalene block is a technique to block brachial plexus in the interscalene groove in the neck. As interscalene brachial plexus block is easy to apply procedure with very few side effects and high success rate and provides postoperative analgesia, it is commonly used (1).

There are no certain criteria developed for venous port catheter implantation. Venous ports that are subcutaneously implanted are preferred to external catheters due to the patient comfort and low rates of infection they provide especially in patients receiving intermittent and prolonged infusion (1).

Corresponding Author: Mehmet Uğur Turhan; Department of Anesthesiology and Reanimation, Niğde Training & Research Hospital, Niğde, Turkey

ORCID: 0000-0003-0961-7165

E-mail: uturrrhan@gmail.com

Received: Oct 17, 2019 **Accepted:** Nov 28, 2019

Published: Dec 17, 2019

This is an Open Access article distributed under the terms of Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, or reproduction in any area, original work is properly cited.

The Ulutas Medical Journal © 2019



Subcutaneous venous port implantation has been used in chemotherapy, continuous parenteral nutrition, and long term antibiotic treatment since the use of the first venous port implantation performed by Neiderhuber et al. with the surgical method in 1982 (2). Also, subcutaneous venous port implantation with the fluoroscopy-guided percutaneous method was demonstrated by Moris et al. in 1992 and it has become popular since then (3).

The nerve that innervates the appropriate area for interscalene block is found with a peripheral nerve stimulator and blocked, which provides sufficient surgeon and patient satisfaction generally. With this method, better pain control is achieved on the first postoperative day, and fewer side effects are seen compared to narcotic analgesics (4). Even when the blocked catheter is placed, sufficient pain control can be achieved without any strong intravenous narcotic analgesics (5).

Subcutaneous port implantation is performed with the fluoroscopy-guided percutaneous method in our department. In our procedures under sedoanalgesia or general anesthesia, long recovery periods, prolonged hospital discharges or pain complaints in the first 24 hours after the intervention may be high. In this study, subclavian venous port implantation was performed under interscalene block and patient satisfaction, the efficiency of the procedure and complications were evaluated.

Materials and Methods

Forty patients between the ages of 40 and 65 who underwent venous port catheter implantation under interscalene block were prospectively analysed with the approval of the ethical committee of Istanbul Training and Research Hospital. Patients with coagulopathy,

thrombocytopenia (less than 50,000), infection at the location of intervention, and severely decreased general condition were excluded from the study. The patients were informed about interscalene block. After the written consent of the patients was obtained on the day of the procedure, their values of electrocardiogram (ECG), peripheral oxygen saturation (SpO₂), and non-invasive blood pressure (NIBP) were measured and monitored. Intravenous (iv) line was established in the passive arm with a 22g cannula. Isotonic intravenous infusion of 5 mL/kg/h of NaCl was initiated and 0.03 mg/kg of midazolam was intravenously administered as anxiolytics. After the right neck and shoulder site where the venous port was going to be placed were cleaned with antiseptic solution, 10mL of the levobupivacaine 0.25%+10mL of lidocaine 1%+10 mL of prilocaine 1% were used by 50mm (23G Pajunk) of a peripheral nerve block needle with classical Winnie technique by using superficial probe with ultrasonography (MINDRAY DP-20) when a response from deltoid muscle contraction was obtained at a current of 0.5 mA. The sensory block was assessed with a pinprick test. When sufficient block level was achieved, the skin was cleaned with an antiseptic solution and a sterile drape was spread over the site of the procedure. Lateral 1/3 end of the clavicle was marked and 1 cm of incision was made by a bisturi 1 cm distal to the skin and under-skin. The right subclavian vein was accessed from the skin incision site with the percutaneous method and a guidewire was placed there. After a 3 cm transverse incision of skin and under-skin 3-5 cm distal to the clavicle, blunt dissection was performed over the pectoral fascia and a suitable space for the port reservoir was opened. This site was combined with the puncture site by opening a

tunnel. Port catheter was installed and placed under the skin. The skin and under-skin were closed inappropriate way and the site was checked up with a chest X-ray. The use of fentanyl 50 mcg as rescue analgesia during the procedure was intended if needed. Patients were transferred to the recovery room and followed up. Their satisfaction scores 2 h after the procedure were evaluated and recorded. Body mass index (BMI) of the patients was calculated with weight and height values. Interscalene block and intervention were recorded in block follow-up forms in patient files and patient satisfaction was evaluated with 4 points Likert scale. To determine the satisfaction level of the patients according to the scale, patients were asked to choose the options of very dissatisfied, dissatisfied, satisfied and very satisfied.

Patients with stable hemodynamic and regressed motor block were informed and discharged from the hospital. They were called after 24 hours and their satisfaction scores and complaints were evaluated and recorded. One-way analysis of variance test matched in repeated measures of the group was used in addition to descriptive statistical methods (mean, standard deviation) in the evaluation of the data, and Newman-Keuls multiple comparison tests were used in subgroup comparisons. The results were evaluated at the significance level of $p < 0.05$.

Results

Forty patients were included in the study. Out of these 40 patients, 26 (65%) were male, and 14 (35%) were female. The mean age was 55.26. The mean body mass index was 22.63 ± 1.94 , the mean height was 168.15 ± 6.90 , and the mean weight was 68.43 ± 8.04 (Table-1).

Table-1. Demographic characteristics of the patients

Variables		N	Mean	SD	Min.	Max.
Age	Male	26	56.46	11.57	29	72
	Female	14	53.21	9.07	38	65
	All	40	55.26	10.71	29	72
BMI		40	22.63	1.94	16	26
Height (cm)		40	168.15	6.90	155	182
Weight (kg)		40	65.43	8.04	45	78

The onset time of sensory block was 9.9 ± 5.3 minutes, and the onset time of the motor block was 9.0 ± 8.3 minutes. The recovery time of the motor block was 9.4 ± 1.11 hours and the recovery time of sensory block was 8.4 ± 1.11 hours. The mean duration of hospital stays of our patients was 9.2 ± 2.9 (Table-2).

Table-2. Mean block times and block onset times

Variables	Mean $\pm$ SD	Min.	Max.
Duration of Motor Block (hour)	9.4 ± 1.11	8	11
Duration of Sensory Block (hour)	8.4 ± 1.11	7	10
Onset Time of Motor Block (minutes)	9.0 ± 8.3	1	39
Onset Time of Sensory Block (minutes)	9.9 ± 5.3	8	32
Duration of Hospital Stay (hour)	9.2 ± 2.9	6	12

The mean VAS value in our patients in the study group was calculated as 2.6 ± 1.32 . There was no significant difference between men and women in terms of VAS score ($p = 0.1$) (Table-3).

Table-3. Mean VAS values of patients in the study group

Variables	Mean $\pm$ SD	Min.	Max.	P
VAS Score (24 hours after the procedure)	2.6 ± 1.32	1	6	
Female	2.5 ± 1.34	1	7	$P = 0.10$
Male	2.6 ± 1.68	1	6	

VAS: Visual analog scale. Values are expressed as n.
*P-values < 0.05 were considered significant

There was no statistically significant difference between the levels of patient satisfaction 2 and 24 hours after the procedure (Table-4).

Table-4. Comparison of mean satisfaction values

Patient Satisfaction	Mean±SD
2 hours after the procedure	3.38±0.81
24 hours after the procedure	3.18±0.64
P- value	0.243

Values are expressed as n.

P-value<0.05 was considered significant

When the satisfaction levels of our patients were evaluated, no patient was completely dissatisfied with the procedure. Satisfaction levels of the patients were evaluated 2 and 24 hours after the procedure. The rate of the patients who were completely satisfied 2 h after the procedure was 55.24%, and the rate 24 hours after the procedure was 27.5% (Table-5).

Heart rate, non-invasive blood pressure, and peripheral oxygen saturation values of the patients before and after the block were recorded. Mean SBP, MAP and DBP values before the block were statistically significantly higher than the mean values after the block. There was no statistically significant difference between mean SpO₂ and heart rate values before and after the block.

There was no patient who needed rescue analgesia during venous port implantation. In the evaluations after the procedure, no finding that suggested infection was found in any of our patients. Complications such as phrenic nerve block, pneumothorax, and pinch off syndrome were not observed in our patients.

Discussion

Eliminating pain and anxiety is the main principle in the management of the patients who underwent surgical intervention (6). Performing any surgical intervention under regional anesthesia is accepted as a safer method than general anesthesia in the condition that sufficient analgesia and appropriate surgical conditions are provided (7). In our study, the peripheral nerve block was preferred instead of general anesthesia due to the current health conditions of the patients who underwent venous port implantation.

Factors such as low analgesic and antiemetic consumption, short stays in recovery room and at hospital, moderate transition to pain control, increased blood flow in extremity, theoretically low frequency of reflex sympathetic dystrophy and no need for tracheal intubation in regional anesthesia methods are accepted as significant

Table-5. Patient satisfaction and onset time of sensory block of the patients in the study group

Patient Satisfaction		Onset time of sensory block							
		8 Minutes		10 Minutes		11 Minutes		15 Minutes	
2 hours after the procedure	Fair	0	0%	1	3.4%	0	0%	0	0%
	Good	0	0%	11	37.9%	1	0%	2	25%
	Very Good	2	100%	18	58.6%	2	100%	3	75%
24 hours after the procedure	Fair	0	0%	4	13.8%	0	0%	1	25%
	Good	1	0%	16	55.2%	2	100%	2	50%
	Very Good	1	100%	10	31%	0	0%	3	25%

advantages of regional anesthesia when compared to general anesthesia. Besides all these positive factors, complications due to the block procedure or local anesthetics may occur in regional anesthesia (8). Like in all invasive interventions, it is crucial to pay attention to asepsis and antisepsis in brachial plexus block. Our advantage against the risk of local or general infection despite the attention paid is bactericidal and bacteriostatic effects of local anesthetics (9). The rate of port infection in oncologic patient groups is reported between 0.6% and 27% in literature (10). In our study, none of our patients had an infection after venous port implantation. We did not need extra analgesics during the 24-hour follow-up period and the duration of hospital stay was shorter than the standard duration of 24-hour in general anesthesia.

Port catheters that can be intravenously used can also be used for intraarterial and intraperitoneal administration of medicines and fluids. It is safely used, especially in cases in which peripheral vascular access is difficult, such as cancer treatment. If there is no other indication, it is crucial to take these patients away from the hospital as soon as possible (11). In our study, the duration of hospital stay was measured as mean 9.2 ± 2.9 hours, and shorter stays in hospital affected patient satisfaction.

The "pinch off" syndrome, which means the fracture or severance of the catheter that is compressed between the clavicle and the first rib, is a complication with infraclavicular pain, paresthesia of the arm, swelling around the port and resistance to infusion. In this syndrome, as the severed part of the catheter may cause emboli and serious cardiac arrhythmias, it should be removed. Lin et al. stated that out of 3358 port catheters they placed throughout

three years, 73 experienced catheter fracture (12). Although the number of patients in our study was less than that in the series of Lin et al., "pinch off" syndrome or any related adverse results were not observed in our patients.

In interscalene block, adjuvant agents can be added to local anesthetics to extend the duration of block and increase the anesthetic effect. It was revealed in the study of Gormley et al. (13) that Alfentanil added to bupivacaine in the axillary block did not make any improvement in the quality of anesthetics or patient satisfaction. It was also stated that the addition of Alfentanil could extend the motor and sensory block, but did not have any clinical analgesic effect.

Flory et al. (14) revealed in their study in which supraclavicular block was performed that morphine added to bupivacaine did not make any improvement in the quality of analgesia or patient satisfaction. In our study, only local anesthetics were used and no adjuvant agent was added. It was reported in the studies of Serour et al. (15) and Gursoy et al. (16) that pain scores were higher in female patients than in male patients, and it was emphasized that the responses of men and women to experimental painful stimuli were different. However, no difference was found between male and female patients in terms of pain scores in our study.

Akelma H et al. (17) compared superficial cervical plexus block and local anesthesia in patients who underwent port catheter implantation and found the VAS value in cervical plexus block as mean 2.62. In our study, the mean VAS score of the patients was 2.6 ± 1.32 . These results are similar to the results of Akelma H et al. In the study of Liisananti et al. (18), there was no statistically significant difference among ropivacaine, evobupivacaine,

and bupivacaine (at concentration of 45mL and 0.5% of) in 5th, 10th and 15th minutes in terms of the quality of sensory block. There was no difference among the three drugs in terms of activity in sensory and motor block evaluations, no side effects secondary to the drugs were observed and it was concluded that ropivacaine or levobupivacaine could be used according to the need for anesthetics when the potential cardiotoxic and neurotoxic effects of bupivacaine were considered. In our study, we preferred levobupivacaine as agent with an intermediate effect.

Catheter placement is determined according to the patient's condition and need. Indwelling catheters are preferred for the patients who need continuous total parenteral nutrition due to the treatment procedures such as long-term intravenous chemotherapy, frequent blood sampling, aggressive chemotherapy combinations, and autologous bone marrow transplantation. In these procedures, it is recommended to keep the port catheter in place especially at the beginning of the procedure (19). In our study, the duration of the motor block was 9.4 ± 1.1 hours and the duration of sensory block was 8.4 ± 1.1 hours. These durations that can be evaluated as partly long were satisfactory for the patients. The onset time of the motor block was 9.0 ± 8.3 minutes and the onset time of sensory block was 9.9 ± 5.3 minutes. In our study, port implantation under interscalene block not only provided analgesia but also kept the port in place by restricting the shoulder movements until the motor block completely ended. This duration was long to initiate the procedure. However, it did not affect patient satisfaction measured 2 hours after the procedure.

When the need for postoperative analgesia is evaluated with the results of similar studies, Liisanantti et al. (18) determined the time needed for the first postoperative analgesia as 17.8 ± 7.2 hours in bupivacaine group, 17.1 ± 6.5 hours in levobupivacaine group and 15.0 ± 5.4 in ropivacaine group in their studies. In our study, none of the patients needed postoperative analgesia in a 24-hour follow-up period.

Conclusion

By the use of the subcutaneously implanted venous port catheter, the daily activity of the patients is maintained and the risk of infection decreases. Effective analgesia and a high rate of patient satisfaction were achieved in the procedure of port implantation with interscalene block. However, the use of nerve stimulator or ultrasonography for interscalene block and the requirement for experience in interscalene block are the limitations. It is concluded that interscalene block can be administered for venous port implantation under appropriate conditions.

Conflict of Interests

The authors have declared no conflict of interest for the present article.

References

1. Chelly J, Greger J, Al TS, Gebhard R, Masson M, Matuszczak M, et al. Reduction of operating and recovery room times and overnight hospital stays with interscalene blocks as sole anesthetic technique for rotator cuff surgery. *Minerva anesthesiologica* 2001; 67(9): 613-9
2. Niederhuber J, Ensminger W, Gyves J, Liepman M, Doan K, Cozzi E. Totally implanted venous and arterial access system to replace external catheters in cancer treatment. *Surgery* 1982; 92(4): 706-12
3. Morris S, Jaques P, Mauro M. Radiology-assisted placement of implantable subcutaneous infusion ports for long-term venous access. *Radiology* 1992; 184(1): 149-51
4. Borgeat A, Schappi B, Biasca N, Gerber C. Patient-controlled Analgesia after Major Shoulder Surgery Patient-controlled Interscalene Analgesia versus Patient-controlled Analgesia.

Anesthesiology: The Journal of the American Society of Anesthesiologists 1997; 87(6): 1343-7

5. Fredrickson MJ, Ball CM, Dalglish AJ. Successful continuous interscalene analgesia for ambulatory shoulder surgery in a private practice setting. 2008

6. Mackenzie R. Anesthesia at remote locations. In: Miller RD, Anesthesia, 5th Edition. 2000. pp. 2241-69

7. Özyalçın S, Erdine S. Üst ekstremité somatik blokları. Rejyonel Anestezi, 1st ed İstanbul; Nobel Tıp Kitabevleri 2005: 83-93

8. DAVIS WJ, LENNON RL, WEDEL DJ. Brachial plexus anesthesia for outpatient surgical procedures on an upper extremity. Mayo Clinic Proceedings. 1991 Elsevier; pp. 470-3

9. Kayhan Z. Lokal Anestezikler: Klinik Anestezi (3. Baskı). İstanbul: Logos Yayıncılık 2004: 503-23

10. Yildizeli B, Lacin T, Batirel H, Yüksel M. Complications and management of long-term central venous access catheters and ports. The journal of vascular access 2004; 5(4): 174-8

11. Nelson BE, Mayer AR, Tseng PC, Schwartz PE. Experience with the intravenous totally implanted port in patients with gynecologic malignancies. Gynecologic oncology 1994; 53(1): 98-102

12. Lin C, Wu H, Chan D, Hsieh C, Huang M, Yu J. The mechanisms of failure of totally implantable central venous access system: analysis of 73 cases with fracture of catheter. European Journal of Surgical Oncology(EJSO) 2010; 36(1):100-3

13. Gormley W, Murray J, Fee J, Bower S. Effect of the addition of alfentanil to lignocaine during axillary brachial plexus anesthesia. British journal of anesthesia 1996; 76(6): 802-5

14. Flory N, Van-Gessel E, Donald F, Hoffmeyer P, Gamulin Z. Does the addition of morphine to brachial plexus block improve analgesia after shoulder surgery? British journal of anesthesia 1995; 75(1): 23-6

15. Racz H, Gunning K, Santa Della D, Forster A. Evaluation of the effect of perineuronal morphine on the quality of postoperative analgesia after axillary plexus block: a randomized double-blind study. Anesthesia and analgesia 1991; 72(6): 769-72

16. Gursoy A, Ertugrul DT, Sahin M, Tutuncu NB, Demirer AN, Demirag NG. The analgesic efficacy of lidocaine/prilocaine (EMLA) cream during fine-needle aspiration biopsy of thyroid nodules. Clinical endocrinology 2007; 66(5): 691-4

17. Akelma H, Salik F, Bicak M, Erbatur ME. Local Anesthesia for Port Catheter Placement in Oncology Patients: An Alternative to Landmark Technique Using Ultrasound-Guided Superficial Cervical Plexus Block-A Prospective Randomized Study. Journal of oncology 2019; 2019: 2585748. 2019/08/31

18. Liisanantti O, Luukkonen J, Rosenberg P. High-dose bupivacaine, levobupivacaine and ropivacaine in axillary brachial plexus block. Acta anaesthesiologica scandinavica 2004; 48(5): 601-6

19. Groeger J, Lucas A, Coit D. Venous access in the cancer patient. Principles and Practice of Oncology Updates 1991; 5(3): 1-19

Contact Details of the Authors

Mehmet Uğur Turhan; uturrrhan@gmail.com

Niğde Training and Research Hospital, Department of Anesthesiology and Reanimation, Niğde, Turkey
ORCID:[0000-0003-0961-7165](https://orcid.org/0000-0003-0961-7165)

Mustafa Kaçmaz; muskac51@gmail.com

Ömer Halisdemir University, Department of Anesthesiology and Reanimation, Niğde, Turkey
ORCID:[0000-0002-8655-3882](https://orcid.org/0000-0002-8655-3882)

Veysel Erden; veyselerden@gmail.com

İstanbul Training and Research Hospital, Department of Anesthesiology and Reanimation, İstanbul, Turkey
ORCID:[0000-0004-3565-3883](https://orcid.org/0000-0004-3565-3883)

How to cite?

Turhan MU, Kacmaz M, Erden V. Effect of Venous Port Implantation Under Interscalene Block on Patient Satisfaction and Quality of Analgesia. Ulutas Med J. 2019;5(4):255-261

DOI: 10.5455/umj.20191027021217