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Pain and functioning of patients after endovascular treatment of thoracoabdominal aortic aneurysms during the first five days after the procedure

Ból i funkcjonowanie pacjentów po endowaskularnym leczeniu tętniaków aorty piersiowo – brzusznej w pierwszych pięciu dobach po zabiegu

Marta Katarzyna Hreńczuk, Dominika Zadrożna

Department of Surgical and Transplantation Nursing, and Extracorporeal Therapies, Medical University of Warsaw, Poland/
Zakład Pielęgniarstwa Chirurgicznego, Transplantacyjnego i Leczenia Pozaustrojowego, Warszawski Uniwersytet Medyczny, Polska

CORRESPONDING AUTHOR:
Marta Katarzyna Hreńczuk
Zakład Pielęgniarstwa Chirurgicznego, Transplantacyjnego i Leczenia Pozaustrojowego,
Warszawski Uniwersytet Medyczny, Warszawa, Polska
ul. Nowogrodzką 59, pawilon 11D1
02-006 Warszawa
e-mail: marta.hrenczuk@wum.edu.pl

STRESZCZENIE

BÓL I FUNKCJONOWANIE PACJENTÓW PO ENDOWASKULARNYM LECZENIU TĘTNIAKÓW AORTY PIERSIOWO – BRZUSZNEJ W PIERWSZYCH PIĘCIU DOBACH PO ZABIEGU

Cel pracy. Ocena bólu i funkcjonowania pacjentów po operacji tętniaków aorty piersiowo-brzusznej.
Materiał i metody. W badaniu wzięło udział 35 pacjentów po operacji tętniaka aorty piersiowo-brzusznej (stentgraft), leczonych w Klinice Chirurgii Ogólnej, Naczyniowej i Transplantacyjnej Warszawskiego Uniwersytetu Medycznego w okresie od marca do maja 2021 roku. W badaniu wykorzystano metodę sondażu diagnostycznego, a narzędziem badawczym był kwestionariusz własnej konstrukcji, wykorzystujący numeryczną i opisową skalę bólu oraz Skalę Laitinena. Wyniki poddano analizie w programie SPSS Statistics 21.0.
Wyniki. U 54,3% badanych najsilniejsze dolegliwości bólowe występowały w pierwszej dobie po zabiegu, u 45,7% ból występował okresowo i najbardziej odczuwalny był wieczorem (48%). Ponad połowa (60%) respondentów wskazała, iż odczuwany ból całkowicie wpłynął na przemieszczanie się/chodzenie i wtedy był najsilniejszy, tak było też przy uruchamianiu. Natężenie bólu i występowanie ograniczeń w funkcjonowaniu nie miało statystycznie istotnej korelacji z analizowanymi zmiennymi socjo-medycznymi (p>0,05).
Wnioski. Ból towarzyszył pacjentom po operacji tętniaka aorty piersiowo-brzusznej i ograniczał ich funkcjonowanie, przez co potrzebowali pomocy w wykonywaniu podstawowych czynności życiowych.

Słowa kluczowe: **ból, tętniak aorty piersiowo-brzusznej, leczenie endovascularne, funkcjonowanie pacjentów**

ABSTRACT

PAIN AND FUNCTIONING OF PATIENTS AFTER ENDOVASCULAR TREATMENT OF THORACOABDOMINAL AORTIC ANEURYSMS DURING THE FIRST FIVE DAYS AFTER THE PROCEDURE

Aim. The study assessed the pain and functioning of patients after thoracoabdominal aortic aneurysms surgery.
Material and methods. The study involved 35 patients after the thoracoabdominal aortic aneurysm surgery. The study used the method of a diagnostic survey, and the research tool was a proprietary questionnaire, using a numerical and descriptive pain scale and the Laitinen Scale. The results were analyzed in the program SPSS Statistics 21.0.
Results. When it comes to 54.3% of the respondents, they experienced the strongest pain on the first day after the procedure, 45.7% experienced the pain periodically and it was felt the most in the evening (48%). More than half of the respondents indicated that the experienced pain completely affected the movement/walking and it was the strongest then, and it was the same while getting up. Pain intensity and the presence of functional limitations did not have a statistically significant correlation with the analyzed socio-medical variables (p>0.05).
Conclusions. Patients experienced the pain after thoracoabdominal aortic aneurysm surgery and it limited their functioning, therefore they needed help in performing basic life activities.

Key words: **pain, endovascular aneurysm repair, thoracoabdominal aortic aneurysm, functioning of patients**

INTRODUCTION

Aneurysm is the most common aortic lesion. In most cases, it does not give any symptoms and the diagnosis is made accidentally during imaging examinations. There is no pharmacological treatment and the only effective form of therapy is surgical treatment, which is closely related to postoperative pain experienced by the patient during recovery [1].

Postoperative pain is an acute pain and it arises as a result of intraoperative intervention into tissues or organs in the body. It is an individual and subjective matter for each patient, which is related to the difficult assessment of its intensity. In order to make its assessment easier and faster, various types of scales and questionnaires are used in everyday hospital practice to determine the severity of pain, as well as the effectiveness of pharmacotherapy and the impact of pain on the physical and psychosocial functioning of the patient. In the postoperative period, one of the basic therapeutic measures is pain prevention and relief [2].

Determining limitations and deficits in functioning is important in planning care for a specific group of patients. Therefore, the aim of the study is assessment of pain and functioning of patients after thoracoabdominal aortic aneurysm surgery.

MATERIALS AND METHODS

Study design and setting

The study was conducted from March to May 2021 at the General, Vascular and Transplant Surgery Clinic at the Central Clinical Hospital of the University Clinical Center of the Medical University of Warsaw. The research was anonymous and voluntary. The study was conducted in accordance with the requirements of the Helsinki Declaration. The Bioethics Committee of the Medical University of Warsaw acknowledged the information about the study (AKBE/216/2020), the hospital authorities and the head of the Clinic agreed to the study.

Participants

There were 35 (81%) of all 43 patients, treated with an endovascular aneurysm repair (EVAR) method, participating in the study, 3 (7%) of them did not agree to take part in the study, 5 (12%) of them were excluded due to insufficient physical and/or mental condition. The participants concerned were examined from the 1st to 5th day after the procedure. Out of 35 patients under study, 68.6% were men. The average age of the respondents was 70 years (SD 8.36), the oldest patient was 88 years old, the youngest was 27 years old. Retirees accounted for 82.8% of the study group. When it comes to 42.9% of the participants, they were overweight, the average value of the body mass index (BMI) was 27.83 kg/m2. As far as 37.1% of patients are concerned, they were on day 2 after surgery and the same number was on day 3. Patients were on average on day 2.82 (SD 1.01) after the procedure.

Survey questions/knowledge measurement

The research method was a diagnostic survey, and the used tool was a proprietary questionnaire, using a numerical and descriptive pain scale and the Laitinen Scale. Numerical Rating Scales (NRS) from 0 to 10, with 0 as no pain, 5 as moderate pain, and 10 as the worst imaginable pain was used. The descriptive scale was divided into five degrees – no pain (0), low-intensity pain (1), medium-intensity pain (2), high-intensity pain (3) and very-high-intensity pain (4). Pain intensity was monitored according to the departmental procedure every 6 hours. The Latinen Scale enabled to assess the pain intensity, the determination of its frequency, the frequency of using painkillers, and to indicate limitations in daily activity. Each indicator is assigned with points from 0 to 4, where 0 means no problem and 4 is maximum problem. The record sheet consisted of 8 questions, the purpose of which was to characterize the patients in terms of age, sex, place of residence, education, professional activity, one day after the surgery, as well as weight and height, and the value was calculated on the basis of the latter (BMI).

Statistical analyses

The statistical analyses were performed with the use of the SPSS Statistics 21.0 statistical package. The chi-square test was used to test the statistical relationship between the analyzed features. The obtained results were statistically analyzed using the x2 test for independent samples. A 5% risk of inference error was assumed. A probability value of $p<0.05$ was considered statistically significant.

RESULTS

The average of the highest pain experienced by patients on the first five days after surgery was 4.43 on the NRS and 3.31 on the descriptive scale. The average of the lowest pain experienced was 1.65 on the NRS and 2.05 on the descriptive scale (Tab. 1).

Tab. 1. Statistical analysis of the highest and lowest pain experienced by patients on the first five days after surgery

	The highest pain (NRS 0-10)	The highest pain (descriptive scale 0-5)	The lowest pain (NRS 0-10)	The lowest pain (descriptive scale 0-5)
Average	4.4286	3.3143	1.6571	2.0571
N	35	35	35	35
SD	1.97463	1.02244	1.86205	0.96841
Min.	1	1	0	0
Max.	10	5	8	4
F	2.15272	0.98473	2.12998	1.06499
p	0.045	0.003	0.003	0.007

N - number of observations; SD - Standard Deviation; Min. - minimum; Max - maximum;
p - level of statistical significance; F - ANOVA test result
NRS - Numerical Rating Scale

Pain intensity did not have a statistically significant correlation with the analyzed variables such as: age, sex, BMI and day after surgery.

The respondents indicated that the lowest pain occurred in the afternoon hours (60%), while the highest pain occurred in the evening (48%).

More than half (54.3%) of the respondents indicated that the highest pain occurred on the first day after the procedure. The pain was the most intense on the second day for 20%. The smallest number of patients (2.9%) indicated day 3 as the feeling of the strongest pain. Pain after surgery occurred periodically for 45.7% of patients, 25.7% felt pain constantly, 17.2% very often, and 11.4% often. The highest pain was experienced by the respondents during movement and getting up. The patients felt slightly lower pain while performing hygiene activities, changing clothes and breathing. The smallest pain was caused by taking meals. However, no activity was statistically significant (Tab. 2).

Tab. 2. List of activities causing the highest pain

Activities of the day	N	Minimum	Maximum	Average	SD	Variance
breathing	35	1	3	1.5143	0.65849	0.882
starting movement (changing position in bed, getting out of bed)	35	1	3	2.3714	0.59832	0.642
taking meals	35	1	2	1.4857	0.50709	0.807
hygiene activities	35	1	3	2.1429	0.77242	0.211
moving/ walking	35	1	3	2.5429	0.61083	0.487
changing clothes	35	1	3	1.9714	0.61767	0.860

N - number of observations; SD - Standard Deviation

While analyzing the extent to which the occurring pain limited the activity of patients after the procedure, the following rating system was adopted: 1 – not at all, 2 – partially, 3 – completely. Then the averages and SD were calculated. The analysis of the results showed that both women and men had a problem with the pain of moving, and a little less with the actuation. On the 2nd, 3rd and 4th day after the procedure, the pain limited during moving and starting movement. There was a significant correlation between the day after the surgery and the presence of limitations in the performance of individual activities after the surgery. The further the day after the procedure, the smaller the limitations. Taking into account the BMI, it was observed that the pain caused the greatest limitation for moving and starting movement for all respondents. Only for patients with the obesity class II, the pain limited the starting movement, breathing, hygiene activities and changing clothes to the same extent. There was no significant statistical relationship between the analyzed variables and the presence of limitations in the performance of individual activities after the procedure (Tab. 3).

Patients aged > 70 most often needed help with starting movement and changing body position. Men did not require any help more often than women (29.2% versus 18.2%). Most of the women needed help while starting movement, and the men also while changing position as well as starting movement. Most of the respondents on day 2 after the surgery, all on day 3 and 5, and half of the respondents on day 4 needed help with starting movement. When it comes to 83.3% of patients, on day 3 they needed help in changing their body position. While 62.5% of respondents on day 4 needed help in changing their body position and eating meals as well. While analyzing patients in terms of BMI, it turned out that people with normal body weight needed help mostly while changing body position (70%) and starting movement (70%). Most of the overweight people (73.3%) indicated the need for assistance while starting movement. Respondents with the obesity class I needed help, particularly in changing the body position (75%), and those with the obesity class II needed help to the same extent while changing body position, starting movement, eating and using the toilet (50%).

The major percentage of the respondents (85.7%) indicated that they were receiving analgesics rarely after the procedure, 8.6% did not know how often they received analgesics, 5.7% indicated that they were given analgesics continuously. As far as 40% of the is concerned, respondents assessed the analgesic treatment as very good, and 28.6% as good. While 20% indicated the answer „neither good nor bad", 11.4% assessed it as rather bad.

DISCUSSION

Approximately 30% to 75% of patients experience medium to severe postoperative pain [3,4,5,6]. These reports are consistent with our own studies. In the Tamer et al. study [7], who studied patients after orthopedic surgery, the average for the most and the least severe pain experienced within the first 24 hours after the surgery was 7.5 ± 1.4 and 2.8 ± 1.4, respectively. In our study, the average for the intensity of the strongest and the smallest pain was definitely lower, amounting to 4.4 ± 1.9 and 1.6 ± 1.8, respectively, but this average concerned the first five days. It should be emphasized that the pain occurred periodically for almost half of the patients (45.7%), it was continuous for ¼ of the patients, it was strongest on the first day, i.e. within the first 24 hours after the procedure and in the evening, and the pain was the lowest in the afternoon hours. Pain intensity does not have a statistically significant correlation with such factors as sex, age, postoperative day, BMI ($p>0.05$). Statistically significant correlation between pain intensity and the analyzed variables was also observed by Bakalis [8], who assessed pain of patients after thoracic surgery.

Effective pain treatment is an integral part of modern surgical practices. Postoperative pain should be prevented and controlled. The use of right analgesic treatment and educating the patient about pain and its treatment alleviates his/her fears and reduces the experienced discomforts, preventing postoperative complications, accelerating healing, minimizing the side effects of analgesic treatment,

Tab. 3. The analyzed variables and the presence of limitations in the performance of individual activities after the procedure, related to the experienced pain

SEX		breathing	starting movement (changing position in bed, getting out of bed)	taking meals	hygiene activities	moving /walking	changing clothes
Female	Average	1.8182	2.4545	1.4545	2.1818	2.5455	2.0909
	N	11	11	11	11	11	11
	SD	0.75076	0.52223	0.52223	0.75076	0.52223	0.70065
Male	Average	1.3750	2.3333	1.5000	2.1250	2.5417	1.9167
	N	24	24	24	24	24	24
	SD	0.57578	0.63702	0.51075	0.79741	0.65801	0.58359
Total	Average	1.5143	2.3714	1.4857	2.1429	2.5429	1.9714
	N	35	35	35	35	35	35
	SD	0.65849	0.59832	0.50709	0.77242	0.61083	0.61767
F		3.687	0.303	0.059	0.040	0.000	0.593
p		0.064	0.586	0.810	0.843	0.987	0.447
DAY AFTER THE PROCEDURE							
1	Average	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
	N	1	1	1	1	1	1
	SD*	-	-	-	-	-	-
2	Average	1.1538	2.0769	1.2308	1.8462	2.3077	1.6923
	N	13	13	13	13	13	13
	SD	0.37553	0.49355	0.43853	0.68874	0.48038	0.63043
3	Average	1.9167	2.7500	1.6667	2.5833	2.9167	2.3333
	N	12	12	12	12	12	12
	SD	0.79296	0.45227	0.49237	0.51493	0.28868	0.49237
4	Average	1.5000	2.3750	1.6250	2.0000	2.5000	2.0000
	N	8	8	8	8	8	8
	SD	0.53452	0.51755	0.51755	0.92582	0.75593	0.53452
5	Average	2.0000	3.0000	2.0000	3.0000	3.0000	2.0000
	N	1	1	1	1	1	1
	SD*	-	-	-	-	-	-
Total	Average	1.5143	2.3714	1.4857	2.1429	2.5429	1.9714
	N	35	35	35	35	35	35
	SD	0.65849	0.59832	0.50709	0.77242	0.61083	0.61767
F		2.922	5.452	2.073	2.914	4.879	2.810
p		0.037	0.002	0.109	0.038	0.004	0.043
BMI							
Normal	Average	1.6000	2.5000	1.4000	2.3000	2.6000	2.2000
	N	10	10	10	10	10	10
	SD	0.84327	0.70711	0.51640	0.94868	0.51640	0.78881
Overweight	Average	1.4000	2.2000	1.4667	2.0000	2.3333	1.8000
	N	15	15	15	15	15	15
	SD	0.50709	0.56061	0.51640	0.65465	0.72375	0.56061
Obesity class I	Average	1.5000	2.6250	1.6250	2.2500	2.8750	2.0000
	N	8	8	8	8	8	8
	SD	0.53452	0.51755	0.51755	0.88641	0.35355	0.53452
Obesity class II	Average	2.0000	2.0000	1.5000	2.0000	2.5000	2.0000
	N	2	2	2	2	2	2
	SD	1.41421	0.00000	0.70711	0.00000	0.70711	0.00000
Total	Average	1.5143	2.3714	1.4857	2.1429	2.5429	1.9714
	N	35	35	35	35	35	35
	SD	0.65849	0.59832	0.50709	0.77242	0.61083	0.61767
F		0.548	1.339	0.285	0.362	1.467	0.837
p		0.653	0.280	0.836	0.781	0.243	0.484

N- number of observations; SD-Standard Deviation; p- level of statistical significance; F- ANOVA test result
BMI – Body Mass Index
*too few respondents

preventing the transformation of acute pain into chronic pain and shortening the entire recovery period [5,9]. Pain treatment is also an important indicator of health and healthcare quality accreditation standards [10]. For this reason, the importance of quality pain treatment in postoperative care cannot be underestimated. Providing effective pain treatment is one of the key elements of patient satisfaction, which is an indicator of the quality of hospital care, which is important in surgical wards [11,12,13].

In the case of patient care after surgery, it is important to identify factors that increase and reduce postoperative pain, plan nursing interventions and implement pain treatment, not only pharmacological but also non-pharmacological analgesia. Studies on this subject found that activities such as getting out of bed, coughing, standing up, moving and changing the dressing on the wound after surgery cause pain [14,15]. In the present study, the patients experienced the highest pain while moving and starting movement, and the lowest pain was experienced by the patients while taking meals. Taking into account the conditions causing postoperative pain, it is important in planning the assistance to the patient by the nursing staff, the importance of timely and effective analgesic treatment planning prior to these activities should be emphasized. Pain treatment is one of the most important roles of nurses working in surgical wards. For surgical patients, untreated and uncontrolled pain can cause fatigue; therefore postoperative pain assessment and pain treatment are the most important nursing interventions [10].

The own study focused on the impact of pain on the performance of everyday activities and the functioning of the patients during their hospital stay. After analyzing the results, a deficit in the self-care of patients was observed, resulting from the presence of the pain, which made them need help. Such a diagnosis may be important in planning nursing care for this group of the patients. Most of the patients experienced deficits in self-care and needed help with basic daily activities. To a large extent, help was needed while starting movement (standing up, going to the toilet), respondents aged > 70 also needed help with changing positions, similarly men, although this group did not need this help more often than women. Patients with the obesity class II, in addition to helping with starting movement and changing body position, needed it more often also during meals and during the toilet. It is connected with the necessity of providing the patient by medical personnel with the best possible physical, mental and educational support, care and provision of right health services. The caring function will be widely applied among operated patients. Correct practice of medical personnel will avoid or reduce the degree of limitations in the functioning of the patient, accelerate the recovery period and home discharge, and improve his/her quality of life [16,17].

The sample size was limited to a small number of patients from only one clinical hospital, therefore the results cannot be generalized to all patients undergoing this type of surgery. Further studies on a larger sample are needed to obtain representative and reliable results for a similar population. Another possible limitation is that this study only identified pain intensity using two quantitative scales, without regard to pain quality, pain treatment, and patient satisfaction with received analgesic care.

CONCLUSIONS

These results suggest that, firstly, analgesic care should be planned and evaluated in order to maintain professional postoperative pain relief nursing services. Treatment of postoperative pain of surgical patients is necessary to improve the functioning of the patient. Secondly, the diagnosis of functional deficits resulting from the experienced pain will enable earlier planning of analgesic treatment and determine the need for nursing care. It is necessary to identify needs of the patient in the area of pain treatment and limitations related to it, to plan educational, treatment, care and rehabilitation activities for the patient and to include them in the process of patient care after surgery.

ORCID

Marta Katarzyna Hreńczuk https://orcid.org/0000-0001-9103-8730
Dominika Zadrożna https://orcid.org/0000-0003-1727-5687

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