



Opinions on Using Operating Room Effectively in Chronic Subdural Hematoma Surgery

Kronik Subdural Hematom Cerrahisinde Ameliyathanenin Etkin Kullanımı Hakkındaki Görüşler

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ABSTRACT

Aim: Chronic subdural hematoma is one of the most common extracerebral hemorrhages that causes significant morbidity with increasing human life. Associations with mild head trauma are reported in 60-80% of the literature. The aim of this study is to investigate whether local and general anesthesia performed in the operation of chronic subdural hematoma patients make a difference in terms of operative time, operation cost and total times for using the operating room.

Material and Methods: The records of 27 patients who were operated with diagnosis of unilateral chronic subdural hematoma between the years 2016 and 2018 in Duzce University Medical Faculty Training and Research Hospital, Neurosurgery Department were reviewed retrospectively. Age, gender, ASA score, operative time, time between entry and exit to the operating room, length of hospital stay and operating costs were recorded.

Results: It was found that the operating cost and total time between entry and exit to the operating room were shorter in patients undergoing local anesthesia, and the difference between patients undergoing general anesthesia was found statistically significant (both p values are <0.001).

Conclusion: In our study, a significant difference was found between the time of entrance and exit of patients who underwent local and general anesthesia. In the general anesthesia group, the costs were significantly higher. In patients with chronic subdural hematoma, local anesthesia is a more useful method in terms of efficient use of hospital operating room and reduction of operating costs. We believe that this practice will also contribute to the national economy.

Keywords: Chronic subdural hematoma; local anesthesia; general anesthesia; cost analysis.

ÖZ

Amaç: Kronik subdural hematom insan ömrünün artmasıyla birlikte sıklığı daha da artan önemli morbiditelere neden olan ve oldukça sık görülen ekstraserebral kanamalardandır. Literatürde hafif kafa travmaları ile birlikteliğinin %60-80 oranında olduğu bildirilmektedir. Bu çalışmanın amacı kronik subdural hematom hastalarının ameliyatında uygulanan lokal ve genel anestezinin ameliyat süresi, ameliyat maliyeti ve toplam ameliyathane odasını kullanım süreleri açısından bir farklılığa sebep olup olmadığını araştırmaktır.

Gereç ve Yöntemler: Düzce Üniversitesi Tıp Fakültesi Sağlık Araştırma ve Uygulama Hastanesi Nöroşirürji Anabilim Dalında 2016 ve 2018 yılları arasında tek taraflı kronik subdural hematom tanısı ile opere edilmiş olan toplam 27 hastanın kayıtları geriye dönük olarak incelenmiştir. Yaş, cinsiyet, ASA skoru, ameliyat süresi, ameliyat odasına giriş ve çıkış zamanları arasındaki süre, hastanede kalış süresinin uzunluğu ve ameliyat maliyetleri kaydedildi.

Bulgular: Lokal anestezi uygulanan hastalarda ameliyat maliyetinin ve ameliyathane odasına giriş ve çıkış arasındaki toplam sürelerinin daha kısa olduğu ve genel anestezi uygulanan hastalar ile arasındaki farklılığın istatistiksel olarak anlamlı olduğu saptanmıştır (her iki p değeri de <0,001).

Sonuç: Çalışmamızda lokal ve genel anestezi uygulanan hastaların giriş ve çıkış zamanları arasında anlamlı bir fark bulundu. Genel anestezi grubunda, maliyetler anlamlı derecede yüksekti. Kronik subdural hematomlu hastalarda lokal anestezi, hastane ameliyathanesinin etkin kullanımını ve işletme maliyetlerinin azaltılması açısından daha faydalı bir yöntemdir. Bu uygulamanın ülke ekonomisine de katkı sağlayacağına inanıyoruz.

Anahtar kelimeler: Kronik subdural hematom; lokal anestezi; genel anestezi; maliyet analizi.

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Geliş Tarihi / Received : 06.05.2019

Kabul Tarihi / Accepted : 20.08.2019

Çevrimiçi Yayın Tarihi /

Available Online : 22.08.2019

INTRODUCTION

Chronic subdural hematoma (CSDH) is one of the most common extracerebral hemorrhages that causes significant morbidity and its frequency increases with increasing human life (1-3). The association with mild head trauma is reported to be 60-80% in the literature (4,5). CSDH may be asymptomatic or may show up with many clinical findings such as headache, fatigue, memory impairment, focal neurological deficit and seizure (1). The definitive treatment is the surgical drainage of the hematoma. Twist-drill craniostomy, craniotomy and craniostomy with single or two burr-holes are the most commonly used surgical techniques (6). Today, the most preferred technique is Burr-Hole drainage because it is less invasive, it can be done with local anesthesia and its success rate is high in elderly patients with high risk.

In this study, it was aimed to investigate whether local anesthesia and general anesthesia in the treatment of CSDH did make a difference in terms of operative time, operation cost and total entrance and exit times to the operating room.

MATERIALS AND METHODS

The records of 27 patients who were operated with the diagnosis of unilateral CSDH between the years of 2016-2018 in Duzce University Medical Faculty Training and Research Hospital, Department of Neurosurgery were retrospectively reviewed after obtaining the local ethics committee approval. This study was approved by local ethics committee of Duzce University (dated 18.02.2019 and numbered 2019/17).

Patients included in the study were divided into two groups according to the anesthesia method. Eleven patients with unilateral CSDH who were operated with general anesthesia were included in the first group and 16 patients with unilateral CSDH who were operated with local anesthesia were included in the second group.

Patients with Glasgow coma scores (GCS) more than 13 and Karnofsky performance index (Table 1) more than 70 was included in both groups.

Table 1. Karnofsky Performance Index

Karnofsky Index	Score
Normal, no complaints, no symptoms	100
Can perform normal activity, there may be a few symptoms or signs of the disease	90
It continues its normal activity with some difficulties, the disease has minor signs and symptoms	80
Can look after himself, cannot do normal activity and his job	70
Can meet the requirements, need rare help, needs some help	60
Frequent assistance and medical care required	50
Special care and assistance required	40
Disabled enough to require hospital care, but there is no risk of death	30
Very ill, need active support treatment in hospital	20
About to die	10
Death	0

In order to access the patient data, the hospital computer system, which is used to keep patient records and information and which is called MIA-MED information system, was used.

Age, gender, American Society of Anesthesiologists (ASA) score, GCS, Karnofsky performance index, operative time, time of entrance and exit times to the operating room, length of hospital stay and operating costs of patients divided into two groups were recorded.

Statistical Analysis

Statistical analysis of all obtained data was performed using SPSS v.16.0 software. Descriptive statistics were given as mean±standard deviation and median (minimum-maximum), as appropriate. Distribution of continuous data were examined by Shapiro-Wilk test, and Independent samples t test was used to compare groups for data with normal distribution, while Mann-Whitney U test was used for data with non-normal distribution. Chi-square test was used for evaluation of categorical data, and summarized as numbers and percentages. A p value of <0.05 was considered statistically significant.

RESULTS

Of the 27 patients included in the study, 12 (44.4%) were female and 15 (55.6%) were male. Their age ranged from 31 to 93 years and the mean age was 74.67±15.21 years. All patients included in the study underwent surgery for unilateral double burr-hole drainage with CSDH. Data were obtained from 11 patients who underwent hematoma with general anesthesia and 16 patients who underwent hematoma with local anesthesia. There were 10 (62.5%) males and 6 (37.5%) females in the local anesthesia group; while 5 (45.5%) male and 6 (54.5%) female patients were in the general anesthesia group. No statistically significant difference was found between the two groups in terms of age and sex (p=0.089, p=0.452 respectively).

When the patients compared according to ASA score, while median ASA of the patients who were operated with general anesthesia were found as 3 (2-3) with mean and standard deviation of 2.73±0.47, median ASA of those operated with local anesthesia was 3 (2-4) with mean and standard deviation of 3.12±0.62. It was determined that the difference between the groups in terms of ASA score was not statistically significant (p=0.162).

When the patients compared according to GCS, while median GCS of the patients who underwent surgery with general anesthesia were found as 13 (13-15) with mean and standard deviation of 13.64±0.81, median GCS of those operated with local anesthesia was 14 (13-15) with mean and standard deviation of 13.69±0.79. It was determined that the difference between the groups in terms of GCS was not statistically significant (p=0.865).

In terms of Karnofsky performance index, similarly there was no statistically significant difference between groups (p=0.451). Median Karnofsky score of the general anesthesia group was found as 80 (70-100) with mean and standard deviation of 80.91±9.44, while median Karnofsky score was found as 80 (70-100) with mean and standard deviation of 83.75±8.85 in the local anesthesia group.

ASA, GCS and Karnofsky performance index comparison between local anesthesia and general anesthesia groups were given in Table 2.

Table 2. Comparison of ASA, GCS and Karnofsky performance index in groups

	Local Anesthesia (n=16)	General Anesthesia (n=11)	P
ASA	3.13±0.62	2.73±0.47	0.162
Score	3 (2-4)	3 (2-3)	
GCS	13.69±0.79 14 (13-15)	13.64±0.81 13 (13-15)	0.865
Karnofsky	83.75±8.85 80 (70-100)	80.91±9.44 80 (70-100)	

ASA: American Society of Anesthesiologists, GCS: Glasgow Coma Scale, values are presented as mean±standard deviation and median (minimum-maximum)

The median duration of hospitalization of 11 patients who received general anesthesia was 9 (5-16) days and the median hospitalization period of 16 patients who received local anesthesia was 8 (5-11) days. There was no statistically significant difference between the duration of hospitalization of the two groups ($p=0.422$).

When the operation time was compared, the mean operation time was 47.73±9.58 minutes in patients receiving general anesthesia and 44.69±11.32 minutes in patients receiving local anesthesia. When the two groups were compared, there was no statistically significant difference between the duration of operation of the patients operated with general and local anesthesia ($p=0.473$).

When compared to the total operating room entry-exit times, the mean time of entry-exit time of the patients who received general anesthesia was 93.64±14.33 minutes and the mean time of entry-exit time of the patients who received local anesthesia was 60.94±12.68 minutes. When the time of entry and exit of the two groups were compared, it was found that the duration of operation of the local anesthesia group was shorter in the operating room compared to the general anesthesia group and the difference between the groups was statistically significant ($p<0.001$).

When the cost of surgery was compared, the median operation cost of 11 patients who received general anesthesia was 139.39 (80.99-323.61) TL, and the median operation cost of 16 patients with local anesthesia was 9.07 (6.86-68.38) TL. Considering the difference between the groups in terms of cost of surgery; it was found that the operations performed with local anesthesia were less costly than those performed with general anesthesia and the difference between the groups was statistically significant ($p<0.001$).

Comparison of hospital stay, operation time, entrance and exit time to the operating room and cost in local and general anesthesia groups were given in Table 3.

DISCUSSION

CSDH was first reported by JJ Wepfer in 1656 (7). CSDH occurs frequently in elderly patients because of the decrease in brain weight due to aging and the increase in extracerebral volume (8). The increase in the elderly population with the prolongation of human life increases the frequency of CSDH. It is reported that the average age is 53-63 years and it is more common in men (9). The mean age of the patients in this study was 74.67±15.21 and the number of male patients was higher than that of female patients.

It is reported that anticoagulant use due to cardiovascular diseases that are common in this age group is also a reason to frequent occurrence in elderly patients.

There are many publications in the literature about the choice of surgical technique. Mc Kissock et al. (10) provided a significant reduction in mortality by Burr-Hole drainage in the surgical treatment of CSDH. Çelikoğlu et al. (9) reported that single or double Burr-Hole application was faster and less morbid.

In the treatment of CSDH, which occurs more frequently in elderly patients, the development of serious complications after surgical procedures under general anesthesia and the emergence of other comorbidities have led to the preference of the surgeries under local anesthesia. In recent studies, the minimization of the surgical field has been prominent as well as local anesthesia (11,12).

First of all, it is also necessary to take into account the conditions of the country in every medical procedure where patient benefit is considered. In recent years, a significant increase in the number of patients undergoing surgical treatment due to increased diagnosis and treatment methods due to the developments in technology is evident from the data of the Republic of Turkey Ministry of Health (13). Increasing the number of patients undergoing surgery, patients not waiting long surgery queues, efficient use of operating rooms to increase the income rates of hospitals has gained great importance. In order to avoid problems caused by the absence of empty operating room, which is one of the biggest problems of hospitals, operating rooms should be used as efficiently as possible in terms of time. The decrease in hospital expenses will increase the rate of hospitals' profits and will cause less damage to public institutions.

In this study, a significant difference was found between the time of entrance and exit to the operating room of the patients who underwent local and general anesthesia. The most important reason for this is the time spent in the intubation and extubation of the patient to be given general

Table 3. The effect of local and general anesthesia on hospital stay, duration of operation, and cost

	Local Anesthesia (n=16)	General Anesthesia (n=11)	P
Hospitalization period (days)	8.19±1.91 8 (5-11)	9.45±3.42 9 (5-16)	0.422
Duration of operation (minutes)	44.69±11.32 45 (25-65)	47.73±9.58 45 (35-65)	
Entry-exit time to the operating room (minutes)	60.94±12.68 58 (40-80)	93.64±14.33 95 (70-115)	<0.001
Cost of surgery (Turkish lira)	17.81±19.47 9.07 (6.86-68.38)	166.17±84.52 139.39 (80.99-323.61)	

Descriptive statistics are presented as mean±standard deviation and median (minimum-maximum)

anesthesia. Making patients that have undergone general anesthesia wait until their vital signs are stabilized after the extubation also prolongs the period. Since these steps were not available in local anesthesia, the entrance and exit times to the operating room were shortened and the difference was found to be statistically significant. Türk et al. (14) reported that it did not change in patients with CSDH under local and general anesthesia similar to our study. However, a study which calculates the entrance and exit time to the operating room was not found. We believe that the operation methods that will shorten the entrance and exit times to the operating room will help operation rooms to be used more efficiently.

Another important issue for hospitals is the costs. In the study, the costs were significantly higher in the general anesthesia group. The reason for this is the intubation tube used for intubation and the medical drugs (rocuronium bromide, midazolam, fentanyl, propofol, bridion). On the other hand, in the local anesthesia group, medical drugs (fentanyl citrate, propofol, midazolam, dexmedetomidine) were used for mild sedation and prilocaine was used during the scalp incision.

When these conditions are considered, Burr-Hole craniostomy under local anesthesia in patients with chronic CSDH is the method that can be preferred because of the decrease in duration of patient stay in the operating room and reduction in hospital costs. In this way, more patients can be operated during the day and also the loss of public institutions can be prevented with lower cost rates. In recent years, there has been a significant increase in the number of patients undergoing surgical treatment due to increased diagnosis and treatment methods due to technological developments (13). Increasing the number of patients undergoing surgery, patients not waiting for long periods of time, and increasing the rate of income of hospitals is essential for efficient use of operating rooms. In order to avoid problems caused by the absence of empty operating room, which is one of the biggest problems of hospitals, operating rooms should be used as efficiently as possible in terms of time. Once again, the decrease in hospital expenses will increase the rate of hospitals' profits and will cause less damage to public institutions.

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