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Epidural Hematoma Surgery at the University Clinical Centre of Kosovo (2015-2020)

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Abstract: Hematoma is a common problem that occurs as a result of damage to one of the larger blood vessels in the body. A hematoma can look like a bruise, but bruises occur due to damage to small blood vessels rather than large ones. Hematomas are often described based upon their location. The most dangerous hematomas are those that occur inside the skull. There are three categories of hematoma: Epidural Hematoma, Subdural Hematoma, Intracerebral (intraparenchymal) Hematoma. Epidural hematoma is when bleeding occurs between the tough outer membrane covering the brain (dura mater) and the skull. Purpose: The purpose of this research was the analysis of epidural hematomas operated and treated in the University Clinical Center of Kosovo in the Neurosurgery Clinic. Materials and methods: In this retrospective clinical study-research, are taken into account the cranio-traumas presented at the UCCK Emergency Center during the period 2015-2020, specifying the traumas with epidural hematomas in which the neurosurgical intervention was performed and a small number of traumas that were treated conservatively. Results: In the neurosurgery clinic in UCCK since 2015-2020, were operated and treated a total of 107 cases with epidural hematomas. The smallest number of cases recorded was in 2015 with a total of 14 cases, out of which 12 were operated on and 2 were conservatively treated, while the largest number was on 2018 with 27 cases, out of which 21 were operated and 6 were treated conservatively. Conclusion: Cranio-cerebral traumas with epidural hematomas, as well as some of those associated with other brain traumas, are more common in men than women with a ratio of almost 2:1. The operated cases (86) underwent surgery on the day of admission after clinical and radiological examination and had a 5-10 day hospital stay. Keywords: Epidural Hematoma, Cranial Traumas, Neurosurgery clinic in UCCK

Introduction

Hematoma is a common problem that occurs as a result of damage to one of the larger blood vessels in the body. Most people experience a hematoma at some point in their lives. A hematoma can look like a bruise, but bruises occur due to damage to small blood vessels rather than large ones.[1]

The most common cause of a hematoma is injury or trauma to blood vessels. This can happen as a result of any damage to blood vessels that can disrupt the integrity of the
blood vessel wall. Symptoms of a hematoma generally depend on its size and location. Pain, swelling, redness, and disfiguring bruises are common symptoms of hematoma in general. [2]

Hematomas are often described based upon their location. The most dangerous hematomas are those that occur inside the skull. Because the skull is an enclosed container, anything that takes up space increases pressure within and potentially impairs the ability of the brain to function.[3]

There are three categories of hematoma:

- **Epidural Hematoma**
- **Subdural Hematoma**
- **Intracerebral (intraparenchymal) Hematoma** [4]

![Fig.1 Picture of an epidural, subdural, and intracerebral hematomas](image)

**Epidural hematoma** is when bleeding occurs between the tough outer membrane covering the brain (dura mater) and the skull. The cause is typically head injury that results in a break (fracture) of the temporal bone[5] and it is commonly result from a blow to the side of the head. The pterion region, which overlies the middle meningeal artery, is relatively weak and prone to injury.[6]
Epidural bleeds from arteries can grow until they reach their peak size 6–8 hours post-injury, spilling 25–75 cubic centimeters of blood into the intracranial space [7]. Many people with epidural hematomas experience a lucid period immediately following the injury, with a delay before symptoms become evident. As blood accumulates, it starts to compress intracranial structures, which may impinge on the third cranial nerve, causing a fixed and dilated pupil on the side of the injury [8].

Epidural hematomas usually appear convex in shape because their expansion stops at the skull's sutures, where the dura mater is tightly attached to the skull [9]. Diagnosis is typically by CT scan or MRI [10].

**Purpose**

The purpose of this research was the analysis of epidural hematomas operated and treated in the University Clinical Center of Kosovo in the Neurosurgery Clinic.
specific goals were to analyze the way these cases were treated, their association with other cranial traumas, postoperative complications and deficient neurological problems.

Materials and methods
In this retrospective clinical study-research, are taken into account the cranio-traumas presented at the UCCK Emergency Center during the period 2015-2020, specifying the traumas with epidural hematomas in which the neurosurgical intervention was performed and a small number of traumas that were treated conservatively. The results obtained are presented in tables and graphs.

Results
In neurosurgery clinic in UCCK since 2015-2020, were operated and treated a total of 107 cases with epidural hematomas. The smallest number of cases recorded was in 2015 with a total of 14 cases, out of which 12 were operated on and 2 were conservatively treated, while the largest number was on 2018 with 27 cases, out of which 21 were operated and 6 were treated conservatively.

Table 1: Epidural Hematomas operated and conservatively treated during the years 2015-2020

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases</th>
<th>Operation Performed</th>
<th>Conservatively Treated</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>14</td>
<td>12</td>
<td>2</td>
</tr>
<tr>
<td>2016</td>
<td>20</td>
<td>16</td>
<td>4</td>
</tr>
<tr>
<td>2017</td>
<td>22</td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td>2018</td>
<td>27</td>
<td>21</td>
<td>6</td>
</tr>
<tr>
<td>2019</td>
<td>24</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>86</td>
<td>21</td>
</tr>
</tbody>
</table>
The time that patients spent hospitalized on the Neurosurgery clinic in UCCK, was 5-10 days, where the lowest values are shown in 2019 with an average of 6.6 days.

Table 2: The average number of postdays patients spent hospitalized

<table>
<thead>
<tr>
<th>Year</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average stay(in days)</td>
<td>7.6</td>
<td>6.7</td>
<td>7.6</td>
<td>7.6</td>
<td>6.6</td>
</tr>
</tbody>
</table>
The number of patients who were observed during this research, shows that males have almost twice as much tendency to suffer cranial trauma with a total of 66.36%, compared to females with 33.64%. Values vary in different years where the highest value recorded by males was in 2019 with 75%, while that of females in 2017 with 40.91%.

*Table 3: Performance of cases with epidural hematoma operated by UCCK, sorted by year and sex, 2015-2020*

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases</th>
<th>M</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
</tr>
<tr>
<td>2015</td>
<td>14</td>
<td>64.29</td>
<td>5</td>
</tr>
<tr>
<td>2016</td>
<td>20</td>
<td>70.00</td>
<td>6</td>
</tr>
<tr>
<td>2017</td>
<td>22</td>
<td>62.96</td>
<td>9</td>
</tr>
<tr>
<td>2018</td>
<td>27</td>
<td>62.96</td>
<td>10</td>
</tr>
<tr>
<td>2019</td>
<td>24</td>
<td>75.00</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>66.36</td>
<td>36</td>
</tr>
</tbody>
</table>
Out of 107 cases of epidural hematomas in the period 2015-2020, 19 cases have been associated with other cranial traumas such as subdural, intracerebral hematomas and hemorrhagic contusions. During the analysis of the number of cases with other accompanying traumas we notice that the highest values were presented in 2018 with a total of 7 cases, and the most common accompanying traumas encountered were intracerebral hematomas with a total of 7 cases, where 3 of them were only in 2017.

Table 4: Performance of cases with Epidural Hematoma associated with other cranial traumas

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases</th>
<th>Subdural</th>
<th>Intracerebral</th>
<th>Hemorrhagic contusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>14</td>
<td>2</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>2016</td>
<td>20</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2017</td>
<td>22</td>
<td>1</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>2018</td>
<td>27</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>2019</td>
<td>24</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>6</td>
<td>7</td>
<td>6</td>
</tr>
</tbody>
</table>
In Decompressive Cranioectomies which are 9 cases in total, a part of the skull bone is removed in order to release the pressure from the swelling of the brain. Most often cases of this type were seen during 2018 with a total of 4 cases which were caused by epidural hematomas accompanied by subdural ones in 2 cases and hemorrhagic contusions in 2 cases. All 98 of the other 107 cases were osteoplastic craniotomies.

Table 5: Osteoplastic Craniotomies and Decompressive Cranioectomy cases based on the associated cranial traumas

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases</th>
<th>Osteoplastic Craniotomy</th>
<th>Decompressive Cranioectomies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Subdural</td>
<td>Intercerebral</td>
</tr>
<tr>
<td>2015</td>
<td>14</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>2016</td>
<td>20</td>
<td>19</td>
<td>0</td>
</tr>
<tr>
<td>2017</td>
<td>22</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>2018</td>
<td>27</td>
<td>23</td>
<td>2</td>
</tr>
<tr>
<td>2019</td>
<td>24</td>
<td>22</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>98</td>
<td>3</td>
</tr>
</tbody>
</table>
Cases with complications which have been re-operated, are 4 in total or 3.73%, where every year there is one case (0.93%), except in 2015 which has none.

*Table 6: Performance of cases with complications that got re-operated*

<table>
<thead>
<tr>
<th>Year</th>
<th>Complications</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2016</td>
<td>1</td>
<td>0.93</td>
</tr>
<tr>
<td>2017</td>
<td>1</td>
<td>0.93</td>
</tr>
<tr>
<td>2018</td>
<td>1</td>
<td>0.93</td>
</tr>
<tr>
<td>2019</td>
<td>1</td>
<td>0.93</td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>3.73</td>
</tr>
</tbody>
</table>
In the structure of patients with epidural hematomas we see that 35 cases or 32.71% are associated with neurological deficiency, where the highest number was in 2018 with 12 cases or 44.44% and the lowest in 2016 with 4 cases or 20%.

Table 7: Performance of cases associated with Neurologic Deficiency

<table>
<thead>
<tr>
<th>Year</th>
<th>Cases</th>
<th>Neurologic Deficiency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>14</td>
<td>5</td>
<td>35.71</td>
</tr>
<tr>
<td>2016</td>
<td>20</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>2017</td>
<td>22</td>
<td>8</td>
<td>36.36</td>
</tr>
<tr>
<td>2018</td>
<td>27</td>
<td>12</td>
<td>44.44</td>
</tr>
<tr>
<td>2019</td>
<td>24</td>
<td>6</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>35</td>
<td>32.71</td>
</tr>
</tbody>
</table>
Discussion

The results obtained from patients in the Neurosurgery Clinic at UCCK we see that the number of cases with epidural hematomas during 2015-2020 is 107 cases of which 86 were operated and 21 were treated, while in a study published in the Open Journal of Modern Neurosurgery is said that 46 consecutive cases of epidural hematomas were operated at the University Hospital Center of Yaoundé, Cameroon, between February 2006 and December 2013 [11].

Postoperative patients had an average hospital stay of 7.6 days (a range of 5-10 days) before being discharged, and a study published in the journal World of Neurosurgery found that patients spent an average of 15.4 postoperative days in hospital (7.5 in the ICU) [12]

The number of patients who were observed during this research, shows that males have almost twice as much tendency to suffer cranial trauma with a total of 66.36%, compared to females with 33.64%. A similar result was shown on an article published on starpearls website, which says that an epidural hematoma occurs in 2% of all head injuries and up to 15% of all fatal head traumas and that males are more often affected than females. Furthermore, the incidence is higher among adolescents and young adults. [13]

Out of 107 cases of epidural hematomas in the period 2015-2020, 19 cases were associated with other cranial traumas such as subdural, intracerebral hematomas and
hemorrhagic contusions. A research has been published on the publication platform "frontiers in neurology" which has analyzed hemorrhagic contusions after decompression craniectomy in traumatic brain injury, where in its research it has resulted that out of 182 cases of hemorrhagic contusions 17 have been associated with epidural hematomas.[14]

In Decompressive Cranioectomies which are a total of 9 cases, a part of the skull bones is removed in order to relieve the pressure from the swelling of the brain, the other 98 cases were Osteoplastic Craniotomies. In a conference paper published in Acta Neurochirurgica Supplementum it was researched on Eighty consecutive patients treated surgically with AEDH (Acute Epidural Hematoma) who were evaluated retrospectively. Patients were divided into two groups: (a) hematoma evacuation (HE: 46 cases) and (b) HE + an external decompression (ED: 34 cases) [15]

Only 4 cases or 3.73% in 107 are complications of epidural hematomas which had to be re-operated. A reference to epidural hematomas has been published on the well-known medical reference website Medscape, which states that epidural hematomas complicate 2% of head trauma cases (approximately 40,000 cases per year). Alcohol and other forms of intoxication have been associated with a higher incidence of epidural hematoma. The incidence has remained stable for many years. [16]

Conclusion

Our research on Epidural Hematomas in the period 2015-2020 comes to a conclusion that craniocerebral traumas with epidural hematomas, as well as some of those associated with other brain traumas, are more common in men than women with a ratio of almost 2:1. The operated cases (86) underwent surgery on the day of admission after clinical and radiological examination and had a 5-10 day hospital stay. All epidural hematomas that have been associated with other traumas have been more prone to decompressive craniectomy compared to those that have not been associated with other cranial traumas and have been performed as Osteoplastic Craniotomies. A small number of these Epidural Hematomas have led to postoperative complications, which had to be reoperated. A large proportion of cases with Epidural Hematomas after surgery have recovered but some of them have ended up with Neurological deficiencies, especially those cases which have been associated with other cranial hematomas.

References


