Treatment of haemorrhagic shock: a case report

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ABSTRACT
The aim of this case report is to demonstrate that during extensive and long-lasting mutilating operations it is necessary to use an aggressive volume replacing approach to maintain adequate tissue oxygenation.

A satisfactory level of tissue oxygenation is necessary to uphold the function and structure of cells, tissue and organs. Monitoring the haemodynamic function during the operation is an important task for the anaesthesiologist.

We present a case of a 58-year-old woman with widespread malignant disease, who underwent surgical treatment in our hospital.

The operation was mutilating and long-lasting. During the perioperative period the patient received a large volume of fluids and blood products due to extensive intraoperative blood loss. High doses of vasoactive drugs were also introduced to achieve haemodynamic stability.

Due to adequate and aggressive volume replacement, haemodynamic stability was eventually achieved and the outcome was beneficial for our patient.

Key words: haemodynamic stability, blood loss, volume replacement

INTRODUCTION
Adults who lose more than 15% of their blood volume usually require blood transfusions to maintain the transmission capacity of oxygen. Intraoperative blood loss is estimated by adding the amount of blood in the aspiration bottle, measuring the weight of the pads during and after the procedure, and estimating the amount of blood in the rinse solution. Blood resuscitation must be adequate; hemoglobin should be determined intraoperatively (1).

In this case, report we describe a patient with significant haemodynamic instability that occurred during the intraoperative period due to massive loss of circulating blood volume. Intravenous fluid administration is the main therapy that stabilizes the patient and reduces the effects of hemorrhagic shock (2).

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Renal replacement therapy was initiated on day one due to oligo-anuria, uremia and metabolic imbalance. On the second postoperative day the patient was subjected to a new surgical procedure to complete the planned surgical treatment. The operation was uneventful. On the 30th postoperative day the patient was transferred to the surgical unit.

DISCUSSION
Volume replacement is the basis of hemodynamic stabilization in hemorrhagic shock (3). Transfusion therapy is a supportive part of the treatment of many diseases and clinical conditions. It is justified only in cases when the lack of blood component cannot be compensated by another, alternative way, and non-adherence would cause deterioration of the clinical condition or endanger the patient’s life (4).

The standard therapeutic procedure during volume replacement must achieve the correction of global hemodynamic blood pressure variables, leading to a variable outcome of critically ill patients (5). The variability of outcomes is the result of unrecognized shock that is masked by the patient’s compensating mechanisms (6). Poes et al (7) have shown that there is no ideal hemodynamic variable that could serve as a predictor of outcome.

In most cases, an accurate diagnosis and therapy depend on the precise measurement of hemodynamic parameters (8). Although the pulmonary artery catheter is the “gold standard” for hemodynamic monitoring, less invasive methods such as PiCCO (Pulse Contour Cardiac Output), LIDCO (Lithium Dilution Cardiac Output), transthoracic and transesophageal echocardiography are used for hemodynamic monitoring and the assessment of volume status in critically ill patients (9).

Furthermore, large blood loss leads to coagulopathy. To determine the degree of coagulopathy precisely, a thromboelastograph (TEG®) and/or thromboelastometer (ROTEM®) should be used. These methods provide global information on the dynamics of development, stabilization and dissolution of clots that reflect in vivo hemostasis (10).

None of the aforementioned monitoring was available intraoperatively. We estimated the
volume replacement by electrocardiogram, pulse, invasive arterial pressure, central venous pressure measurement and laboratory findings (complete blood count, acid-base status and coagulation parameters). Static parameters of hemodynamics were the leading source in the decision-making and therapy adjustment. Despite the lack of above mentioned monitors, the patient had a satisfactory postoperative outcome and recovered well.

CONCLUSION

In patients undergoing major surgical interventions with large blood losses, it is imperative to use aggressive volume replacement in order to achieve adequate tissue oxygenation. Large fluid inputs also carry a significant danger of potential complications, so additional hemodynamic monitoring should be employed as early as possible, after the resuscitation phase has ceased.

In our case, the patient responded well to our resuscitation measures, so we did not expand the monitoring any further. At the same time, various methods of surveillance are available to the clinician, reducing the occurrence of multiple organ dysfunction - or its early recognition and treatment.

Table 1. Numerical display of volume loss and its replacement

<table>
<thead>
<tr>
<th></th>
<th>INTRAOPERATIVE</th>
<th>0.DAY</th>
<th>1.DAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>VOLUME LOSSES (ml)</td>
<td>12690</td>
<td>7750</td>
<td>3125 + CVVHFD 600ML</td>
</tr>
<tr>
<td>VOLUME REPLACEMENT (ml)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crystalloids</td>
<td>10000</td>
<td>4000</td>
<td>4000</td>
</tr>
<tr>
<td>Colloids</td>
<td>2500</td>
<td>500</td>
<td>1000</td>
</tr>
<tr>
<td>RBC Concentrates</td>
<td>4040</td>
<td>4310</td>
<td>1880</td>
</tr>
<tr>
<td>FFP</td>
<td>2250</td>
<td>3370</td>
<td>--</td>
</tr>
<tr>
<td>Cryoprecipitate</td>
<td>--</td>
<td>980</td>
<td>--</td>
</tr>
<tr>
<td>Thrombocytes</td>
<td>--</td>
<td>1508</td>
<td>300</td>
</tr>
<tr>
<td>Albumins 5%</td>
<td>--</td>
<td>--</td>
<td>250</td>
</tr>
<tr>
<td>TOTAL VOLUME REPLACEMENT (ml)</td>
<td>18790</td>
<td>14668</td>
<td>7430</td>
</tr>
<tr>
<td>Continuous norepinephrine infusion (mcg/min)</td>
<td>77</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>Continuous epinephrine infusion (mcg/min)</td>
<td>23</td>
<td>--</td>
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</tr>
</tbody>
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REFERENCES