Case Report

Air embolism through open hub of external jugular vein intravenous cannula

Chitta R. Mohanty\textsuperscript{a}, Suma R. Ahmad\textsuperscript{b}, Mantu Jain\textsuperscript{c,}\textsuperscript{*}, Bhavna Sriramka\textsuperscript{d}

\textsuperscript{a} Department of Trauma & Emergency, AIIMS, Bhubaneswar, 751019, India
\textsuperscript{b} Department of Anaesthesia and Critical Care, AIIMS, Bhubaneswar, 751019, India
\textsuperscript{c} Department of Orthopaedics, AIIMS, Bhubaneswar, 751019, India
\textsuperscript{d} Department of Anaesthesia and Critical Care, IMS & SUM Hospital, Bhubaneswar, 751003, India

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\textbf{ABSTRACT}

\textbf{Introduction:} Venous air embolism is a catastrophic complication that can result in sudden cardiac arrest and death. Massive air embolism has been reported with central venous catheter through the internal jugular and subclavian veins. Though external jugular vein is a potential site of an air embolism to cardiac chambers and subsequently to vital organs such as brain, heart and lungs but has not been reported yet in literature.

\textbf{Case presentation:} We are reporting a case of sudden pulmonary air embolism in a patient through the open hub of an intravenous cannula, vigilant monitoring and timely action saved the patient from a catastrophic outcome.

\textbf{Conclusion:} We recommend vigilant monitoring and adequate precaution in patients with external jugular venous cannulation in the operation theater, intensive care unit or wards to prevent iatrogenic complications.

1. Introduction

External jugular venous (EJV) cannulation is being increasingly used in emergencies patients for fluid and inotrope administration.\textsuperscript{1} Air embolism is a catastrophic complication that can result in sudden cardiac arrest and death. Massive air embolism has been reported with central venous cannulation through the internal jugular and subclavian veins.\textsuperscript{2,3} Although the external jugular vein is a potential site of an air embolism to the cardiac chambers and subsequently to the lungs, in the literature, there is only one case report published.\textsuperscript{4} We are reporting a case of sudden pulmonary air embolism in a patient being operated for fracture humerus, through the open hub of an intravenous (IV) cannula in the EJV. However, vigilant monitoring and timely action averted a calamitous outcome.

2. Case presentation

A 48-year old male, BMI-27, ASA grade I, who sustained a bilateral proximal humerus fracture in a road traffic accident 5 days prior to hospital admission was posted for bilateral open reduction and internal fixation. His preoperative investigations were within normal limits, with a hemoglobin value of 14 g/ml. The patient had a 16 Gauge IV cannula in the right EJV which was inserted in the emergency department during initial resuscitation. Before induction of anesthesia, another 16 Gauge cannula was inserted in the right lower limb in anticipation of the additional blood loss during a bilateral surgery. The patient was administered general anesthesia and positioned in the beach chair position. Sterile draping covered the head end of patient and anesthetic machine was shifted back a little to enable two surgical teams to operate simultaneously. The surgery started uneventfully and anesthetic machine was shifted back a little to enable two surgical teams to operate simultaneously. The surgery started uneventfully with all vitals in the normal range. An invasive arterial line was secured in the right dorsalis pedis artery for blood pressure (BP) monitoring. During surgery, the anesthetist noticed a sudden drop in end-tidal carbon dioxide (ETCO\textsubscript{2}) to 26 mm Hg followed by a fall in the oxygen saturation (Fig-1 & Table-1). Immediately, the FiO\textsubscript{2} was raised to 100\%, flow increased to 6 liter/min, and nitrous oxide (N\textsubscript{2}O) was switched off. This was associated with tachycardia (heart rate-156/min), sudden hypotension (BP-50/30) and slight ST segment depression on the ECG. An arterial blood sample was taken from the arterial line for urgent arterial blood gas examination. The surgery was stopped and a search for the possible cause of intraoperative hemodynamic and respiratory changes was carried out. Meanwhile, injection adrenaline 100\mu g IV and ringer lactate bolus was administered. The estimated blood loss was about 400 ml. We found the IV set detached from the EJV cannula and the internal jugular vein distented. The EJV cannula was promptly closed. On auscultation, no clinical murmur was heard.

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\textsuperscript{*}Corresponding author.

E-mail address: montu_jn@yahoo.com (M. Jain).

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Fig. 1. Desaturation, drop in the ETCO2 and hypotension within a span of 5 minutes depicted in the trend of vitals of the monitor.

Table 1
Trend of patient vitals as seen in the monitor.

<table>
<thead>
<tr>
<th>Time</th>
<th>Heart Rate (HR) beats/min</th>
<th>Oxygen saturation (SPO2)</th>
<th>Invasive blood pressure (IBP) Systole/Diastole (Mean)</th>
<th>End-tidal carbon dioxide (ETCO2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:29 PM</td>
<td>87</td>
<td>100</td>
<td>107/61 (80)</td>
<td>28</td>
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<td>99</td>
<td>103/58 (76)</td>
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</tr>
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<td>99</td>
<td>108/60 (79)</td>
<td>30</td>
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<td>99</td>
<td>118/64 (84)</td>
<td>30</td>
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<td>99</td>
<td>110/64 (74)</td>
<td>31</td>
</tr>
</tbody>
</table>

Authors contribution
MJ was chief operating surgeon where CM was anesthetist. SA was help when the episode occurred. MJ and CR followed up patient while BS and SA reviewed the literature. SA, BS and MJ wrote up the paper. All authors have read and agree to content of manuscript.

Competing interest
None.

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None.

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