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CLINICAL INFORMATION

Use of bronchial blocker in emergent thoracotomy in presence of upper airway hemorrhage, and cervical spine fracture: a difficult decision

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KEYWORDS
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Abstract Female, 85 y/o, weight: 60 kg, multiple trauma patient. After an initial laparotomy, an emergent thoracotomy was performed using a bronchial blocker for lung isolation (initial active suction was applied). During surgery, bronchial cuff was deflated, causing a self-limited tracheal blood flooding. Reisolation was attempted but it was not as effective as initially. Probably, lung collapse with the same bronchial blocker was impaired in the second attempt because of the obstruction of bronchial blocker lumen by intraoperative endobronchial hemorrhage. Bronchial blocker active suction may contribute to obtain or accelerate lung collapse, particularly in patients that do not tolerate ventilator disconnection technique or lung surgical compression. The use of bronchial blockers technology was a valuable alternative to double lumen tubes in this case of emergent thoracotomy in the context of a patient having thoracic, abdominal trauma, severe laceration of tongue and apophysis odontoid fracture associated to massive hemorrhage, despite several pitfalls that could compromise its use. The authors intend to discuss the advantages and disadvantages of bronchial blockers comparing to double-lumen tubes for lung isolation, and which were the risks of our approach, in this complex multitrauma case.

PALAVRAS-CHAVE
Bloqueadores brônquicos;
Tubos de duplo lúmen;
Toracotomia;
Fratura cervical

Uso de bloqueador brônquico em toracotomia de emergência na presença de hemorragia das vias aéreas superiores e fratura cervical: uma decisão difícil

Resumo Paciente do sexo feminino, 85 anos de idade, 60 kg, com trauma múltiplo. Após uma laparotomia inicial, uma toracotomia de emergência foi realizada usando um bloqueador brônquico (BB) para isolamento pulmonar (sucção inicial ativa foi aplicada). Durante

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a cirurgia, o balonete brônquico foi desinflado, causando um derrame traqueal autolimitado. Reisolamento foi tentado, mas não foi tão eficaz como inicialmente. Provavelmente, o colapso do pulmão com o mesmo bloqueador brônquico foi prejudicado na segunda tentativa devido à obstrução do lúmen do BB pela hemorragia endobrônquica intraoperatória. A sucção ativa do BB pode contribuir para obter ou acelerar o colapso pulmonar, particularmente em pacientes que não toleram a técnica de desconexão do ventilador ou a compressão cirúrgica pulmonar. O uso da tecnologia de bloqueadores brônquicos foi uma alternativa valiosa para os tubos de duplo lúmen neste caso de toracotomia de emergência em paciente com trauma torácico e abdominal, laceração grave da língua e fratura da apófise odontoide associados a hemorragia maciça, apesar de vários riscos que poderiam comprometer seu uso. Os autores pretendem discutir as vantagens e desvantagens dos bloqueadores brônquicos em comparação com os tubos de duplo lúmen para isolamento pulmonar e quais foram os riscos de nossa abordagem nesse complexo caso de multitrauma.

Introduction

Emergency thoracotomy in a patient presenting cervical spine fracture and upper airway hemorrhage is an anesthetic challenge. Bronchial blockers (BB) should be an alternative to double lumen tubes (DLT) in some of these patients.[1,2]

Case report

A female, aged 85 years old, weighting 60 kg and having controlled hypertension as comorbidity, suffered a road accident. She presented a severe laceration of tongue (associated to abundant bleeding), odontoid apophysis fracture, blunt chest trauma with hemothorax, hemoperitoneum, liver injury, perforated hollow gut, infrarenal aortic dissection without compromising lower limb perfusion, hypovolemic shock and coagulopathy.

Submitted to general anesthesia to approach abdominal trauma, and to drain a hemothorax. It was observed significant diffuse hematic loss during laparotomy. At induction of anesthesia: etomidate 10 mg, fentanyl 0.1 mg and rocuronium 70 mg were given (rapid sequential induction). Tracheal intubation was done after a modified Comarch-Lehane grade 2B laryngoscopy was obtained to avoid cervical extension, using a Macintosh blade no. 3, through a conductive stylet. Fiberoscopy and a portable videolaryngoscopy were tried for intubation but they were not effective because of the bloody airway and sudden desaturation. Anesthesia was maintained by a midazolam infusion 10 mg h^{-1} and fentanyl 0.1 mg every hour.

Massive transfusion protocol was early activated (8 red cells packs, 6 fresh frozen plasma packs, 1 pool of platelets, 15 g of aminocaproic acid and 2 g of fibrinogen concentrate was administered in OR without point of care monitoring, during the course of the case).

During laparotomy pulmonary compliance worsened (FiO_2 100%, pressure control ventilation: IPAP 40 mmHg, PEEP 4 mmHg, respiratory rate 18 cycle min^{-1}; minimum tidal volume 200 mL, $PaCO_2$ 72 mmHg, PaO_2 55 mmHg, SpO_2 88%), accompanied by respiratory acidosis (minimum pH 7.0; normal serum lactate values) and there was need for emergent drainage of hemothorax. After hemothorax drainage, the compliance ameliorated significantly. A compression packing was introduced in mouth to control tongue hemorrhage and patient was transferred to the ICU, mechanically ventilated, under norepinephrine (16 $\mu g\,kg^{-1}\,h^{-1}$) support.

During initial 30 min in ICU chest tube drained about 2000 mL. Patient returned to OR to be submitted to right-side thoracotomy. Keeping the cervical collar in place, after exchange endotracheal tube (ETT) 7.0–8.0 mm through an exchanger stylet, pulmonary exclusion was performed with a BB (EZ-Blocker®, 7F) under fiberoptic bronchoscopy (FOB) taking 10 min since BB insertion to thoracotomy incision in lateral decubitus (lung collapse required an initial active suction of −50 mmHg because patient did not tolerate ventilator disconnection technique).

Anesthesia was delivered by midazolam 10 mg h^{-1} and fentanyl 0.1 mg every hour. Rocuronium was given 30 mg h^{-1}, after a bolus of 50 mg.

Patient was ventilated in pressure control mode, under permissive hypercarbia to achieve pH > 7.2 (FiO_2 80%, pressure control ventilation: IPAP 35 mmHg, PEEP 4 mmHg, respiratory rate 18 cycles min^{-1}; minimum tidal volume 250 mL, SpO_2 was around 92%, PaO_2 between 55 and 60 mmHg and $PaCO_2$ between 55 and 65 mmHg). For about 3 h it was performed a partial right lower lobectomy and hemostasis of pericardium, right lung and chest wall. No significant rise of serum lactate level was observed.

After 2 and a half hour from the beginning of surgery, bronchial cuff was deflated to permit bilateral ventilation of the lung. In this moment, ventilation became difficult with sudden worsening of lung compliance and absence capnography was noted.

A significant but self-limited tracheal hematic aspiration was done permitting ventilation. Lung collapse was attempted but it was not as effective as initially probably because of the obstruction of BB lumen by endobronchial blood after surgery have started in a patient that did not tolerate ventilator disconnection technique (bronchial cuff repositioning was confirmed again by fiberoscopy). As surgical hemostasis was almost completed and bronco-

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