"I still can't catch my breath!"

Part II of Stephen's Breathin' (August 2005)

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Stephen's presentation

From last August:

- Stephen, 29, presented to the ED with a severe exacerbation of asthma.
- He responded poorly to aggressive therapy with systemic corticosteroids (methylprednisolone sodium succinate, 120mg), 100% oxygen and continuous inhaled beta agonist/anticholinergic therapy.
- He had a history of poorly controlled asthma, for which he had been hospitalized six months ago.

On admission to the intensive care unit, Stephen is drowsy, confused and lethargic. His PCO_2 (partial pressure of carbon dioxide) is now 49 mmHg and his SaO2 (oxygen saturation) has fallen to 85%, despite the oxygen therapy. Stephen is intubated and, within an hour, his blood pressure falls to 72/40 mmHg.

For more on Stephen go to page 4

Table 1

Possible complications of intubation[1,2]

- Esophageal intubation
- Mainstem intubation
- Hypotension
- Barotrauma
- Pneumothorax
- Hypertension
- Arrhythmia
- Dental trauma
- Cervical spine trauma
- Airway trauma

Questions & Answers

1. What are the indications for intubation in an asthmatic patient?

- Failure of oxygenation or ventilation
- Inability to protect the airway
- The presence of a condition in which deterioration is likely

Asthmatic patients who respond poorly to aggressive, inhaled bronchodilator therapy and intravenous steroids should be carefully monitored for progressive respiratory failure. A sign of respiratory failure in asthma patients who are young and otherwise healthy is a normal or increasing partial pressure of carbon dioxide (PCO_2). Due to the tachypnea of the asthma exacerbation, patients usually have a PCO_2 that is low and any increase indicates progressive exhaustion.

Intubation of asthmatic patients can become increasingly difficult due to progressive airway narrowing and hyperreactive airways.[1,2]

2. What is the appropriate approach to identify complications of intubation?

Possible complications of intubation should be ruled out following any patient deterioration after intubation (Table 1). Verification of tube placement can be achieved using several methods, including auscultation, chest radiograph or by employing an aspiration or end-tidal carbon dioxide detector device.[3] A chest radiograph is important to rule out a pneumothorax. Vital signs, including continuous blood pressure, cardiac monitoring and oxygen saturation monitoring, should be followed closely for the development of hypotension, hypertension and cardiac dysrrhythmias.

Back to Stephen

- After a suspension of ventilation for 30 seconds, there is no improvement in Stephen's blood pressure.
- A 1,000 ml bolus of normal saline is given and an infusion of phenylephrine is initiated.
- His blood pressure normalizes within 15 minutes and the phenylephrine infusion is able to be weaned off.
- He is admitted to the intensive care unit, where aggressive, inhaled beta agonists are administered.
- He improves rapidly and is able to be extubated within 36 hours.

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***This department covers selected points to avoid pitfalls and improve patient care by family physicians in the ED. Submissions and feedback can be sent to* diagnosis@sta.ca.**

3. *Why did this patient develop hypotension after being intubated?*

Hypotension often develops after intubation and the initiation of mechanical ventilation in severe asthmatic patients.[2] Several mechanisms have been proposed, including hypovolemia, the use of sedative medications and lung hyperinflation causing compression of the *vena cava* and, therefore, decreased venous return. In anticipation of this complication in severe asthmatics, intravascular volume should be maintained.[1]

4. *What is the appropriate management of post-intubation hypotension?*

When hypotension develops following intubation, ventilation may be suspended for 30 seconds in order to decrease high intrathoracic pressures. This will often lead to a reversal of the hypotension.[4] Hypotension should also be treated with a fluid bolus of 500 ml to 1,000 ml, which will increase the venous return to the heart.[4] Any medications suspected of contributing to the drop in blood pressure should be minimized. If these measures fail, or if the drop in blood pressure is dramatic, vasopressors may be required to increase blood pressure. Dx

References

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