Use of active Intrathoracic Pressure Regulation during resuscitation

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FINANCIAL DISCLOSURE

I have the following financial interests or relationships to disclose:

none
Manipulating Intrathoracic Pressures

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- a-IPR therapy is delivered with a device that is inserted into a standard respiratory circuit between the patient and a means to provide positive pressure ventilation (bag valve balloon or mechanical ventilator).
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- a-IPR therapy is delivered with a device that is inserted into a standard respiratory circuit between the patient and a means to provide positive pressure ventilation (bag valve balloon or mechanical ventilator).
- a-IPR lowers intrathoracic pressures to subatmospheric levels during the expiratory phase of positive pressure ventilation.
Manipulating Intrathoracic Pressures

CPR

0

-8 cmH\textsubscript{2}O

ResQPOD
Manipulating Intrathoracic Pressures

CPR

Spontaneously Breathing

-8 cmH₂O

-7 cmH₂O

ResQPOD

ResQGARD
Manipulating Intrathoracic Pressures

CPR
Spontaneously Breathing
Mechanically Ventilated

-8 cmH$_2$O
-7 cmH$_2$O
-12 cmH$_2$O

ResQPOD
ResQGARD
CirQLator
Manipulating Intrathoracic Pressures

CPR

Spontaneously Breathing

Mechanically Ventilated

-8 cmH₂O

-7 cmH₂O

-12 cmH₂O

ResQPOD

ResQGARD

CirQLator

CirQPOD
Manipulating Intrathoracic Pressures

CPR

Spontaneously Breathing

Mechanically Ventilated

-12 cmH₂O - 7 cmH₂O

-8 cmH₂O

ResQPOD

ResQGAKD

CirQLator

CirQPOD
Effect of aIPR on Tracheal, Aortic, Intracranial Pressures during CPR
aIPR improved vital organ perfusion compared to S-CPR.

Yannopoulos et al., Circulation 2005;112(6):803-11
aIPR improved 24-hour survival with favorable neurologic function

Total epinephrine during the post-ROSC period was significantly reduced with a-IPR (0.08 ± 0.09 vs 0.29 ± 0.12 mg, p<0.01).

Metzger et al., NAEMSP 2017
ETCO2 levels and ROSC rates were significantly higher in the 11 IPR patient compared to the 74 control patient.

Intrathoracic Pressure Regulation Physiology

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- The increase in venous blood flow back to the heart, increases cardiac preload and consequently, stroke volume and cardiac index.
- Combined, these effects result in an increase in mean systemic arterial pressure, cardiac output, and coronary and cerebral perfusion.
- a-IPR improves venous drainage from the brain, lowers ICP, and reduces the resistance to forward blood flow to the brain.
Other uses

- aIPR can also be used on:
  - brain injury,
  - septic shock,
  - hemorrhagic shock,
  - intraoperative hypotension.
Conclusion

• Even if a-IPR was recently approved by the FDA, several questions remain unanswered, in particular, the exact indication and duration of use.
• Further human clinical evaluation of the therapy will be necessary before a broad use is possible.
Thank you!

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