Patient positioning and intra-abdominal pressure

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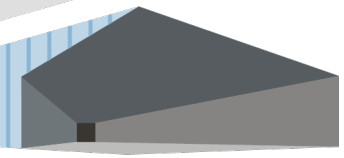

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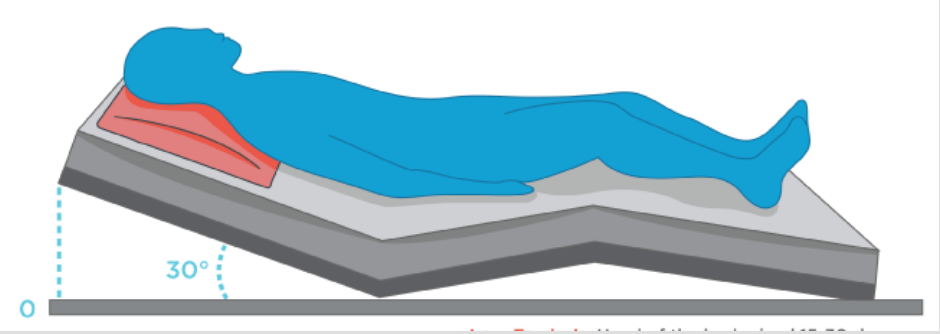
Background



Intra-abdominal pressure (IAP)

- Intra-abdominal hypertension:
  - sustained increase in IAP ≥12mmHg
- Abdominal compartment syndrome:
  - sustained increase in IAP >20mmHg + new onset organ failure

How is IAP measured?

- Via the bladder with a pressure transducer
- In supine position

Challenges:

- Measurement technique is prone to i naccuracy
- Most patients at ICU are positioned in 30° head-of-bed (HOB) elevation

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Background

- Smit et al. 2022:

Table 6. Proposed reference table for correction of intra-abdominal pressure in different head-of-bed positions.

Head-of-bed elevation (°)	IAP (mmHg)
0–20	Pressure measured
20–40	Pressure measured—4
>40	Pressure measured—9

IAP: intra-abdominal pressure.

- Smit M, van Meurs M, Zijlstra JG. Intra-abdominal hypertension and abdominal compartment syndrome in critically ill patients: A narrative review of past, present, and future steps. Scandinavian Journal of Surgery 2022 Feb;111(1):14574969211030128.

Research question

I. How does IAP vary with patient position?
   I. Does HOB elevation influence IAP?
   II. Is it possible to validate the previously proposed reference table to correct for the supine position towards the HOB elevation?
   III. If not, is it possible to find another equation to correct for HOB elevation?

Methods

- Single-center observational study at the ICU on postoperative cardiothoracic patients
- IAP was measured by the Accuryn® Monitoring System by Potrero Medical in supine, 15°, 30°,45° and 60° HOB elevation
- Statistics: repeated measure ANOVA

Patients assessed for enrollment

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Patients included for IAP measurements (N=38)

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Patients included for statistical analysis (N=34)

⇨ Exclusion: <18 years, prostate abnormalities, no consent, suprapubic catheter

⇨ Excluded because of concomitant abdominal surgery (N=1), missing data (N=3)

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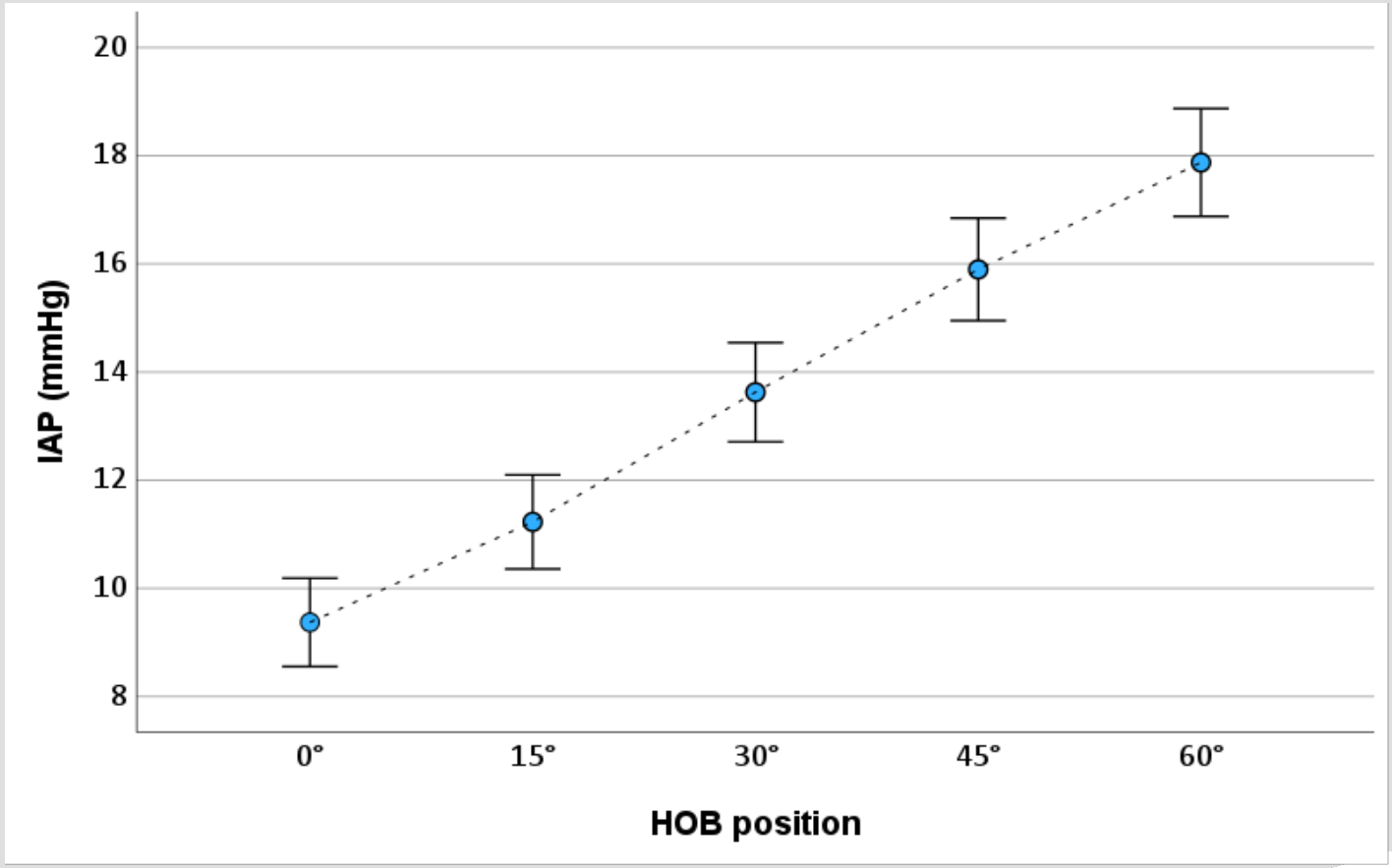
Results

- Mean IAP in supine position: 9.3 mmHg
- ANOVA revealed a significant difference between the mean IAP of the HOB elevations
- Mean difference:
  - 0° to 15°: 1.8 mmHg
  - 15° to 30: 2.4 mmHg
  - 30° to 45°: 2.3 mmHg
  - 45° to 60°: 2.1 mmHg



Mean intra-abdominal pressure per head-of-bed position with 95% CI

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Conclusion

1. This study confirms that HOB elevation has a significant influence on IAP
2. Previously proposed equation by Smit et al. could not be validated
3. We observed an approximately +2mmHg increase per 15° increase in HOB
4. Results should be considered in the upcoming revision in WSACS guideline

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Future research

- Evaluate change of IAP in prone position
- Validation of the proposed equation in a larger patient population and different patient population

Acknowledgments

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