BaroReflex Sensitivity

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Flow of this presentation

• Introduction and Definitions.
  ✓ Terms used in this presentation.
  ✓ Some techniques.
  ▶ Traditional and Modern.
  ▶ Advantages and Tradeoffs.
• Conclusion.

BaroReflex

• It is a homeostatic mechanism decreasing the variation of Blood Pressure.
• It is important for Blood Pressure regulation during changes in body position.
• Analysis of spontaneous BRS shows the changes in pulse interval (PI) elicited by spontaneous changes between systolic blood pressure.
• Also suggested that it protects the brain arteries from hypertrophy of the vascular wall.

Methods of determining BRS

• Traditional Techniques.
  – Invasive approach.
  – Intravenous injection of vasoactive drugs to determine BRS.
  – Some drugs like Phelylephrine were used.
  – Dilator drugs like glyceryl trinitrate was introduced to produce a linear ramp.

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Modern Methods

• Alpha Technique.
  – Also called Spectral Method.
  – This is in the frequency domain.
  – Estimate of the sensitivity of the baroreceptor - heart rate reflex based on frequency-domain analysis of spontaneous variability of systolic blood pressure and R-R interval.
  – Variations in HR and BP using spectral analysis where oscillations at distinct frequencies are predominantly vagal with some sympathetic influences.
Modern Methods

- Sequence Technique.
  - Uses time domain analysis.
  - Based on scanning of beat-to-beat-series of systolic blood pressure and R-R intervals in search of spontaneous sequences of three or more beats.
  - 3 or more beats either decreasing or increasing with one beat delay.

Modern Methods

- Baroreflex effectiveness index.
  - \( BEI = \frac{\text{total number of PI/SBP sequences}}{\text{total number of SBP ramps}} \)
  - Ratio between the number of SBP ramps followed by the concomitant reflex RRI modulation and the overall number of SBP ramps observed in one window.

Comparison of Methods

- Each method processes the BP and HR signals differently.
- Pros and Cons in all the techniques.
- Sequence technique provides a very localized estimate of BRS.
- Spectral method provides an estimate of much smoother SBP oscillations.

Conclusion

- Sequence method is more popular method used.
- Have to do more research on this and try and develop a better estimate.