

Heart rate variability of patients with respect to Induction of Anesthesia - Case of Gynaecologic Surgeries in a tertiary hospital in Cameroon

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Original article:

Introduction

Heart rate variability (HRV), instead of *heart rate*; a physiological phenomenon that goes beyond the heart rate to reflect the sino atrial nodes response to parasympathetic and sympathetic nervous system input. Already used in sports medicine, can be useful in anaesthesia as an early predictor of cardiac events due to anaesthesia and/or surgery. **Our aim was to study intricately the effects of various anaesthetics on the heart using heart rate variability measurements.**

Materials and methods

We carried out a cross-sectional study from the November 1st, 2019 to December 31st, 2021. All patients presenting for gynaecologic surgery under general anaesthesia, with stable haemodynamic parameters were included. HRV of patients were measured at rest, and in 5-minute segments during induction with the aid of a Polar H10 Heart Rate Monitor chest strap. Results were analysed with the aid of KUBIOS software. HRV parameters were compared with baseline resting values and presented in tabular form.

Results

Forty-three female patients undergoing elective gynaecologic surgery, were studied (see Table 1 for induction agents used). There was a general decrease in HRV of patients, following intravenous induction of anaesthesia, with significant sympathetic predominance on the HRV (See Table 2). Introduction of anaesthetic gases was met with significant decreases in LF, HF spectral components of HRV. Advancing age (above 40), obesity, anaemia and hypertension led to decreased HRV with varied contributions of PNS and SNS to individual effects seen.

Table 1. Induction agents used for anaesthesia

Variables		Frequency	Percentage (%)
Induction agents used	halo/ketamine	1	2.3
	halo/propofol	25	58.1
	halo/thiopental	4	9.3
	iso/propofol	10	23.3
	sevo/propofol	3	7.0

*Halo-Halothane, Iso – Isoflurane, Sevo - sevoflurane

Table 2:HRV parameters at Rest Vs IV induction

HRV Parameter	IV Induction	Rest	difference	95% CI	P Value
LFms2FFT spectrum	92.8	61.9	30.9	-5.62701 – 67.40727	0.095
LFms2AR spectrum	27850.8	109.3	27741	-25527.5 – 81010.5	0.299
HFms2FFT spectrum	13.2	11.3	1.9	-6.2 – 10.0	0.638
HFms2AR spectrum	15.7	11.4	4.4	-6.5 – 15.3	0.424
LFHF ratio FFT spectrum	19.0	7.6	11.4	3.0 – 19.7	0.009*
LFHF ratio AR spectrum	885.4	15.7	869.6	-873 – 2612	0.320
SD1ms	4.5	3.9	0.6	-0.1 – 2.1	0.466
SD2ms	22.3	13.2	9.1	-4.6 – 22.7	0.188
RMSSDms	6.2	5.5	0.7	-1.4 – 2.9	0.487
MeanRRms	708.4	730.5	-22.7	-72.0 – 27.7	0.375

Discussion/ Conclusion

We were able to see how various anaesthetic agents impacted the autonomic nervous system. This study represents future prospects of peri-operative screening and fine tuning the selection of anaesthesia agents for surgery for specific populations

Key words: Heart rate variability, Induction, Anaesthesia, low Frequency, High Frequency