Sudden bradycardia: A prospective analysis of the occurrence of the oculocardiac reflex during orbitozygomatic craniotomies

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Introduction

The oculocardiac reflex (OCR) is a sudden decrease in heart rate resulting from mechanical manipulation of the orbit, especially due to traction on the extra-ocular muscles. In approaches to the skull base, utilizing the principle of retracting bone rather than brain, the orbitozygomatic (OZ) approaches are commonly used to approach multiple pathologies. The purpose of this study was to evaluate the occurrence of the OCR during OZ craniotomies to better prepare neurosurgeons and neuroanesthesiologists in the management of patients undergoing OZ craniotomies.

Methods

For the OZ craniotomy, electrocardiographic strips were collected prospectively from 108 patients depict the resting heart rate at stage 1 (control) and the heart rate at stage 2 (orbital manipulation). A deviation of 10 beats per minute or greater from the resting heart rate during orbital manipulation (stage 2) was recorded as an OCR event.

Results

In our 108 patients we detected bradycardia during stage 2 (orbital manipulation) 36% of the time compared with 6% of the time during the standard pterional portion of the craniotomy ($p<0.001$). No statistically significant occurrence of the OCR was found in analysis of the covariates of hypertension, hyperlidemia, diabetes mellitus, hypo/hyperthyroidism, beta-blocker use, calcium channel blocker use, or tobacco use. No patients required anti-cholinergic intervention as a result of OCR, and there were no post-operative ramifications of the OCR.

Effect of type of orbitozygomatic craniotomy on OCR

Variant of Craniotomy with Occurrence of OCR	No OCR (%)	OCR (%)
Full OZ	22 (20.4)	15 (13.9)
Mini OZ	32 (72.7)	12 (27.3)
Modified OZ	13 (62.5)	11 (37.5)
Mini/Maxi OZ	1 (50.0)	1 (50.0)
Mini/Modified OZ	1 (100.0)	0 (0.0)
Significance of Occurrence of OCR for Full, Mini, Modified	p=.249	

No statistically significant effects were noted.

Effect of age on OCR

Mean Age of Patients without OCR occurrence (SD)	54.5 (11.8)
Mean Age of Patients with OCR occurrence	49.7 (13.8)
Median Age of Patients without OCR occurrence	56.0
Median Age of Patients with OCR occurrence	48.0
Significance of Age on Occurrence of OCR	p=.0512

No statistically significant effects were noted.

Effect of co morbidities on OCR

Hypertension	p=.4806
Hyperlipidemia	p=.8986
Thyroid Disorders	p=.8178
Diabetes Mellitus	p=.6457
Tobacco	p=.2118
B-blockers *	p=.2485
* CCBs not analyzed due to low power (n=1)	

No statistically significant effects were noted.

Conclusions

This prospective cohort study was able to show a 36% rate of OCR during orbital manipulation. These data are useful to both neurosurgeons and neuroanesthesiologists in anticipating cardiac arrhythmia during skull base surgeries.

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