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Guest Editorial

Oculo-cardiac and other oculo-visceral reflexes

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Oculo-cardiac Reflex (OCR), is a well-known entity, while other oculo-visceral reflexes are scantly reported. OCR refers to slowing of heart rate and or disturbances in cardiac rhythm resulting from various ocular stimuli. It was first described by Aschner[1] in 1908 and since then an abundant literature on its different aspects has accumulated in journals of ophthalmology and anaesthiology. However, still there is no consensus of opinion with regard to its definition and incidence. The reported incidence of OCR like, different age groups, anaesthetic technique, type of stimulus and type of ventilation used. Thus, there is a need to evolve a criteria to define OCR in different age groups by a team of physicians, paediatricians, anaesthesiologists and ophthalmologists.[2] Presently, a decrease in heart rate by more than 20 percent and or occurrence of cardiac arrhythmias during traction on extraocular muscles as defined by Mirakhur et al.[3] is the most popular.

Oculo-visceral reflexes in general refer to unwanted and potentially dangerous visceral responses which occur following ocular manipulation especially traction on extraocular muscles during surgery or otherwise. The oculo-visceral reflexes are not of uncommon occurrence and in addition to oculocardiac reflex include oculo-gastric, oculo-respiratory and the recently discovered oculo-depresser reflex.

Oculo-respiratory reflex (ORR) which manifests as slowing of respiratory rate and changes in respiratory rhythm on extraocular muscle traction was also first described by Aschner.[1] Since then, a little attention has been paid to it till Blanc et al,[4] reported that ORR is a frequent and potentially dangerous occurrence during extraocular muscle traction. However, it is difficult to explain the paucity of information concerning ORR amongst ophthalmologists and anaesthiologists. There is no mention of ORR even in the currently available textbooks of anaesthesia.[4] This phenomenon may not be recognized in the centres where squint surgery is done under general anaesthesia with controlled ventilation. Further, as there is reflex of automatically, ventilating the patient when something goes wrong, the significance of ORR is often unnoticed. Khurana et al in 1992 described three distinct and different patterns of ORR; the genesis of which needs further exploaration.[5]

Khurana et al in 1992 coined the term oculo-depressor reflex (ODR) for the significant fall in blood pressure during extraocular muscle traction.[6] One might expect the cardiac output and therefore arterial blood pressure to fall in the presence of significant cardiac slowing due to oculo-cardiac reflex (OCR). However, the significant hypotension observed even after abolition of OCR by vagotomy, atropine and glycopyrronium have confirmed it to be distinct and independent of OCR. The pathways of this new reflex have also been hypothesized.[6] The afferent pathways of OCR and ODR might be similar as both the occurrence of OCR as well as fall in blood pressure (ODR) in hundred percent of the animals could be prevented by retrobulbar

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block. It seems that the stimulus is ultimately relayed through the sensory nucleus of the trigeminal nerve possibly to the vasomotor centre leading to reflex hypotension by inhibition of afferent vasosympathetic nerves. However, this hypothesis requires experimental verification.[6]

Lebensohn in 1929 demonstrated Oculo-visceral reflexes: An oculo-gastric reflex experimentally using a stomach balloon connected with a water manometer, tracings were made to demonstrate the effect on gastric motility of astigmatic errors and muscular imbalances artificially produced by the wearing of cylinders and prisms, respectively. Errors of refraction or of muscle balance were definitely shown to exert a repressive effect on the motor function of the stomach, while upon removal of such asthenopic irritants there was a release from inhibition. The irritative reflex occurs by way of the trigeminal and splanchnic nerves. These experiments, confirming clinical experience, emphasize the necessity for closer cooperation between gastrologists and ophthalmologists as to the control of functional gastric disorders.[7]

Ocular surgery involving manipulation of extraocular muscle such as squint, enucleation, retinal detachment etc. is very frequently performed. Therefore, prevention of oculo-cardiac, oculo-respiratory and oculo-depressor reflexes becomes imperative. Since, the retrobulbar injection of 2% xylocaine blocks the afferent pathway of all the three reflexes, its use has been recommended even when the surgery is performed under general anaesthesia. In addition, intravenous atropine or glycopyrronium should also be used to block the efferent pathway of OCR and other visceral reflexes.[3] Further, controlled ventilation must be preferred over spontaneous breathing, at least immediately before, after and during muscle traction, as suggested by Blanc et al.[4]

1. Conflict of Interest

None.

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