

Minimizing Stress Responses at Intubation

It is well known to the anesthesiologists of all levels that complications happen in perioperative period. It also happens in all levels of hospitals. Among the long list of complications adverse cardiovascular events occupy a significant position.¹ Around 200 million adults undergo major noncardiac surgery each year.² and more than 10 million adults worldwide have a major cardiac complication in the first 30 days after noncardiac surgery.³

Like overall Perioperative morbidity and mortality related to anesthesia, cardiovascular complications involve multiple factors. The most often cardiac complications found are systemic arterial hypertension, abnormalities of cardiac rhythm and perioperative myocardial ischemia. Factors independently associated with these complications include the type of surgical procedure, advanced age, duration of anaesthesia and surgery, preoperative abnormal electrocardiogram, abnormal preoperative chest radiography and diabetes. The Cardiac complications (systemic arterial hypertension, systemic arterial hypotension, abnormalities of cardiac conduction and cardiac rhythm, perioperative myocardial ischemia and acute myocardial infarction.⁴ Following anaesthesia and surgery, several triggers for cardiac complications like inflammation, hypercoagulability, hemodynamic compromise, bleeding, and hypothermia are established well. But sympathetic nervous system activation comes in first place commonly.

The cardiovascular derangements may result at any moment of the perioperative period but an anaesthesiologist encounters such changes at the start of an anaesthetic procedure specially at direct laryngoscopy and orotracheal intubation.⁵

The rise in blood pressure and heart rate occurs about 15second after the start of laryngoscopy and becomes maximal after 30-45s. Though transient, these haemodynamic changes may be detrimental in patients particularly associated with cardiovascular and cerebrovascular diseases. Both

the hypertension and tachycardia are associated with decrease in left ventricular ejection fraction and myocardial ischaemia.⁶ To minimize the catastrophe at laryngoscopy and intubation, premedication is practiced for last few decades. Various drugs are practiced starting from antihypertensive to the drugs used in treating neuropathic pain such as oral pregabalin and gabapentin. *Gabapentin* and *pregabalin* vary in terms of binding affinity and potency. Both the drugs are structurally related to inhibitory neurotransmitter gamma-aminobutyric acid (GABA). They act by decreasing the synthesis of glutamate to act in the central nervous system. By this mechanism they exert analgesic, anticonvulsant and anxiolytic activity and is proven effective in preventing neuropathic component of acute nociceptive pain.^{7,8}

In several studies it has been found that gabapentin and pregabalin effectively control haemodynamic derangements at intubation maintains intraoperative haemodynamic stability without post-operative side-effects. While comparing different doses it has been found 1000mg of gabapentine and 150 mg of pregabalin one hour before operation results in better control. So it appears that higher doses are needed to fulfill the purpose.

Another popular premedicant is oral clonidine. It is an imidazoline derivative which has selective agonistic action at alpha-2 adrenoceptors in the vasomotor center of medulla and presynaptically at the peripheral nerve terminals. Its oral application is popular as its bioavailability is 100%. The outcome is blocking of the release of norepinephrine from the nerve terminals leading to hypotension and bradycardia. The parasympathetic outflow is stimulated which results in the slowing of heart rate. In addition, clonidine increases the cardiac baroreceptor reflex sensitivity to an increase in the systolic BP (SBP), and hence stabilizes the BP.⁹

One Study shows that oral clonidine is better than pregabalin.¹⁰ while another shows that both the

drugs are equally effective along with gabapentine. The study reveals that blood pressure is fairly attenuated by pregabalin and gabapentine and heart rate is attenuated by clonidine significantly following laryngoscopy and intubation.¹¹

While the patient is on operating table attenuation is tried with many different techniques using inj. Propofol, short acting opioids, lignocaine, IV betablockers, deepening anaesthesia with volatiles. But newer drugs with improved pharmacokinetics and pharmacodynamics are of paramount interest now a days, dexmedetomidine is such a drug. It is a alpha-2 adrenergic agonist. It has anesthetic sparing, analgesic, sedative, anxiolytic and sympatholytic effects in a dose-dependent manner. It inhibits sympathetic outflow and has analgesic effects. Concerning the deleterious effects of intubation reflexes, attenuation of it has become of great interest. It is evident that large number of studies are being done and on progress. It is also found most studies are mainly done on American Society of Anesthesiologists (ASA) physical status I and II patients. Studies are needed on different patient groups and different types of surgeries for whom laryngoscopy and intubation are needed as the development of safe techniques can further improve the perioperative cardiac morbidity and mortality.

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Dr. Manash Kumar Basu

Professor & Head

Department of Anaesthesiology

National Institute of Cancer Research & Hospital
Mohakhali, Dhaka.

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