سامية محمد مصطفى

شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

سامية محمد مصطفى

شبكة المعلومات الجامعية

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التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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بالرسالة صفحات لم ترد بالأصل

Esmolol Mitigation of the Cardiovascular Responses to Endotracheal Intubation and Reaction to Skin Incision

Thesis

Submitted in Partial Fulfillment of the Requirements
for the Master Degree in Anaesthesia

By

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بسم الله الرحمن الرحيم

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The haemodynamic changes during laryngoscopy and endotracheal intubation are usually of short duration and are well tolerated by patients in the absence of cardiovascular diseases or disturbed intracranial pressure homeostasis (Dahlgren et al., 1981). These changes have been shown to be due to sympathetic discharge caused by stimulation of the upper respiratory tract (Tomori et al., 1969).

Several methods to blunt these responses have been evolved, such as vasodilators (Stoeling et al., 1979), the use of narcotics (Stanley et al., 1980), lidocaine (Miller et al., 1990), α and ß-blockers (Curran et al., 1980 and Mikawa et al., 1991). Each of these drugs had its individual disadvantages, e.g. a large dose of narcotics may lead to postoperative respiratory depression and vasodilators can produce severe hypotension resulting in coronary insufficiency.

Esmolol is an ultrashort acting ß-adrenergic blocking drug characterized by its rapid onset of action and short duration (half life = 9 minutes) that makes it suitable for both bolus administration or continuous infusion without or with little side effects less than that occurring with the use of traditional ß-blockers such as propranolol.

The aim of the present study was to evaluate whether the use of esmolol as an intravenous infusion can obtund the cardiovascular responses to laryngoscopy and intubation, benefits, side effects as well as efficacy of esmolol as an adjuvant drug used with induction agent to reach a safe induction and intubation. Also, the effect of esmolol on skin incision response was involved.

REVIEW OF LITERATURE

Sympathoadrenal Responses to Anaesthesia and Surgery

Derbyshire et al. (1984) reported that nociceptive surgical stimulation is accompanied by increased hypothalamo-pituitary activity which is generally referred to as the stress response to injury. This is manifested by a release of trophic hormones from the hypothalamus which in turn stimulate release of adrenocorticotrophic hormone (ACTH), thyroid stimulating hormone (TSH), growth hormone (GH), follicle stimulating hormone (FSH), luteinizing hormone (LH) and prolactin in addition to antidiuretic hormone (ADH) from the pituitary. Consequently, there is increased secretion of cortisol and thyroxine with suppression of insulin and increase in blood glucose level. In addition, increased hypothalamic activity induced by nociceptive stimulation was accompanied by increased traffic in sympathetic efferent tracts. This was manifested by the well known signs which are conventionally used to diagnose unduly light levels of anaesthesia, notably dilatation of the pupils, sweating, tachycardia and hypertension. Thus, measurements of heart rate, arterial pressure and skin resistance have been used as 'indirect' indices of the level of sympathetic activity to assess both the efficacy of premedication and depth of anaesthesia (Thomson et al., 1988).

Increased sympathetic tone involved augmented release of noradrenaline by presynaptic sympathetic fibers and also increased secretion of catecholamines from the adrenal medulla. Thus, attempts have been made for a number of years to assess sympathetic activity 'directly' by measurement of plasma catecholamines concentration.

Assay of catecholamines:

In 1950, the fluorimetric technique, which was first used to measure catecholamines in urine, was applied to plasma samples by Lund (1950) and it permitted measurement of both total catecholamines (excluding dopamine) and adrenaline (noradrenaline concentrations were calculated by subtraction). However, the fluorimetric technique was used on the expense of its sensitivity (Price, 1966) for measurement of catecholamine concentration in plasma and despite the inaccuracies inherent in this method, it was possible to detect gross changes in plasma catecholamine concentrations. Price and colleagues (1959) were able to demonstrate an increase in noradrenaline and adrenaline concentrations during anaesthesia with diethyl ether.

In 1968, the radioenzymatic method of plasma assay was used by Engleman et al. (1968). The double radioisotope method was more sensitive than fluorimetry, but it was complex, time consuming and required pre-extraction and concentration of catecholamines from relative large volume of plasma. So, modification of the double isotope assay to be the single isotope methods, which were reported to possess assay coefficients of variation of less than 5% for noradrenaline and less than 10% for adrenaline within physiological concentration of the hormones (Passon and Peuler, 1973).

Radioenzymatic techniques were modifications of more recent methods (Daprada et al., 1976). Although these radioenzymatic methods have been used extensively for studies of sympathoadrenal responses during anaesthesia, the

associated high initial capital cost, large recurrent expenses and tedious technical procedures have restricted these techniques to relatively few departments of anaesthesia. In 1978, Hallman and others reported the application of high pressure liquid chromatography (HPLC) which had been developed originally for tissue catecholamine as a method for plasma catecholamine assay. The radioenzymatic and HPLC assays were compared by Hjelmdahl et al. (1979) who concluded that the radioenzymatic assay had the advantages of slightly greater sensitivity, but was more expensive and tedious. In addition, HPLC also allowed samples to be analyzed more rapidly.

Stability of catecholamines:

Carruthers et al. (1970) suggested that catecholamines degraded considerably during storage. However, using HPLC, Falconor et al. (1982) have demonstrated that catecholamine in blood do not degrade if stored at room temperature for up to 1 hour before separation of plasma. Furthermore, plasma samples are stable during storage for up to 6 months at -20°C.

Catecholamines require extraction from plasma before assay. The amount extracted as a percentage of the total is designated the recovery. It is obvious that the higher recovery ensures that more accurate assay, since calculation and measurement errors are reduced. Frequently, the container into which blood samples were drawn contained an anti-oxidant such as sodium metabisulphate, glutathione, or EDTA. The role and values of these substances were disputed. It has been suggested that the percentage recovery was enhanced by the use of such anti-oxidants. However, Falconer et al. (1982) have shown that there was a little