Editorial

iMedPub Journals
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Journal of Pharmacy Practice and Education

2021
Vol.4 No.3:e048

Group of Medicines used for the Treatment of Serious Shock Produced by a Severe Allergic Reaction or Collapse

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Received date: April 01, 2021; **Accepted date:** April 15, 2021; **Published date:** April 22, 2021

Citation: Day K (2021) Group of Medicines used for the Treatment of Serious Shock Produced by a Severe Allergic Reaction or Collapse. J Pharma Prac Edu Vol. 4 No.3: e048

Description

Adrenaline, also known as epinephrine, is a hormone and medication which is involved in regulating visceral functions (e.g., respiration). Adrenaline is normally produced both by the adrenal glands and by a small number of neurons in the medulla oblongata. It plays an important role in the fight-or-flight response by increasing blood flow to muscles, output of the heart by acting on SA Node, pupil dilation response and blood sugar level. As a medication, it is used to treat a number of conditions including anaphylaxis, cardiac arrest, and superficial bleeding. Occasionally it may result in an abnormal heart rhythm. While the safety of its use during pregnancy and breastfeeding is unclear, the benefits to the mother must be taken into account.

One physiological stimulus to adrenaline secretion is exercise. This was first demonstrated by measuring the dilation of a (denervated) pupil of a cat on a treadmill, later confirmed using a biological assay on urine samples. Biochemical methods for measuring catecholamines in plasma were published from 1950 onwards. Although much valuable work has been published using fluorimetric assays to measure total catecholamine concentrations, the method is too non-specific and insensitive to accurately determine the very small quantities of adrenaline in plasma. The development of extraction methods and enzyme-isotope derivate radio-enzymatic assays (REA) transformed the analysis down to a sensitivity of 1 pg for adrenaline.

A link between the sympathetic nervous system and the lungs was shown in 1887 when Grossman showed that stimulation of cardiac accelerator nerves reversed muscarine-induced airway constriction. In experiments in the dog, where the sympathetic chain was cut at the level of the diaphragm, Jackson showed that there was no direct sympathetic innervation to the lung, but that bronchoconstriction was reversed by release of adrenaline from the adrenal medulla. An increased incidence of asthma has not been reported for adrenalectomized patients; those with a predisposition to asthma will have some protection from airway hyper-reactivity from their corticosteroid replacement therapy.

It has been found that adrenergic hormones, such as adrenaline, can produce retrograde enhancement of long-term memory in humans. The release of adrenaline due to emotionally stressful events, which is endogenous adrenaline, can modulate memory consolidation of the events, ensuring memory strength that is proportional to memory importance. Post-learning adrenaline activity also interacts with the degree of arousal associated with the initial coding. There is evidence that suggests adrenaline does have a role in long-term stress adaptation and emotional memory encoding specifically. Adrenaline may also play a role in elevating arousal and fear memory under particular pathological conditions including post-traumatic stress disorder.

Increased adrenaline secretion is observed in pheochromocytoma, hypoglycemia, myocardial infarction and to a lesser degree in essential tremor (also known as benign, familial or idiopathic tremor). A general increase in sympathetic neural activity is usually accompanied by increased adrenaline secretion, but there is selectivity during hypoxia and hypoglycaemia, when the ratio of adrenaline to noradrenaline is considerably increased. Therefore, there must be some autonomy of the adrenal medulla from the rest of the sympathetic system.