حسام مغربى

شبكة المعلومات الجامعية

بسم اللّه الرحمن الرحيم

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التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

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بعض الوثائق الأصلية تالفة

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بالرسالة صفحات لم ترد بالأصل

HIGH FREQUENCY VENTILATION IN PEDIATRIC INTENSIVE CARE

THESIS

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بسم الله الرحمن الرحيم

(سنريهم آياتنا في الآفاق وفي أنفسهم حتى يتبين
لهم أنه الحق، أولم يكف بربك أنه
على كل شيء شهيد)

(سورة فصلت، الآية ٥٣)

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To
my
Parents & My
Wife

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Introduction

INTRODUCTION

Conventional modes of ventilatory support (e.g., volume or pressure cycled positive pressure mechanical ventilation) emulate human breathing patterns. In certain patients with acute lung injury, however, these techniques either can not maintain adequate gas exchange or can do so only at precariously high pressures and volumes that injure the lung and compromise cardiovascular function. To overcome these limitations, several non-conventional techniques of ventilation have been developed, including constant (continous) gas flow and high frequency ventilation (HFV)[1].

HFV is a technique of mechanical ventilatory support in which tidal volumes, on the order of 1 ml/Kg, are applied at rapid respiratory rates (60-600 breaths/min)[2,3].

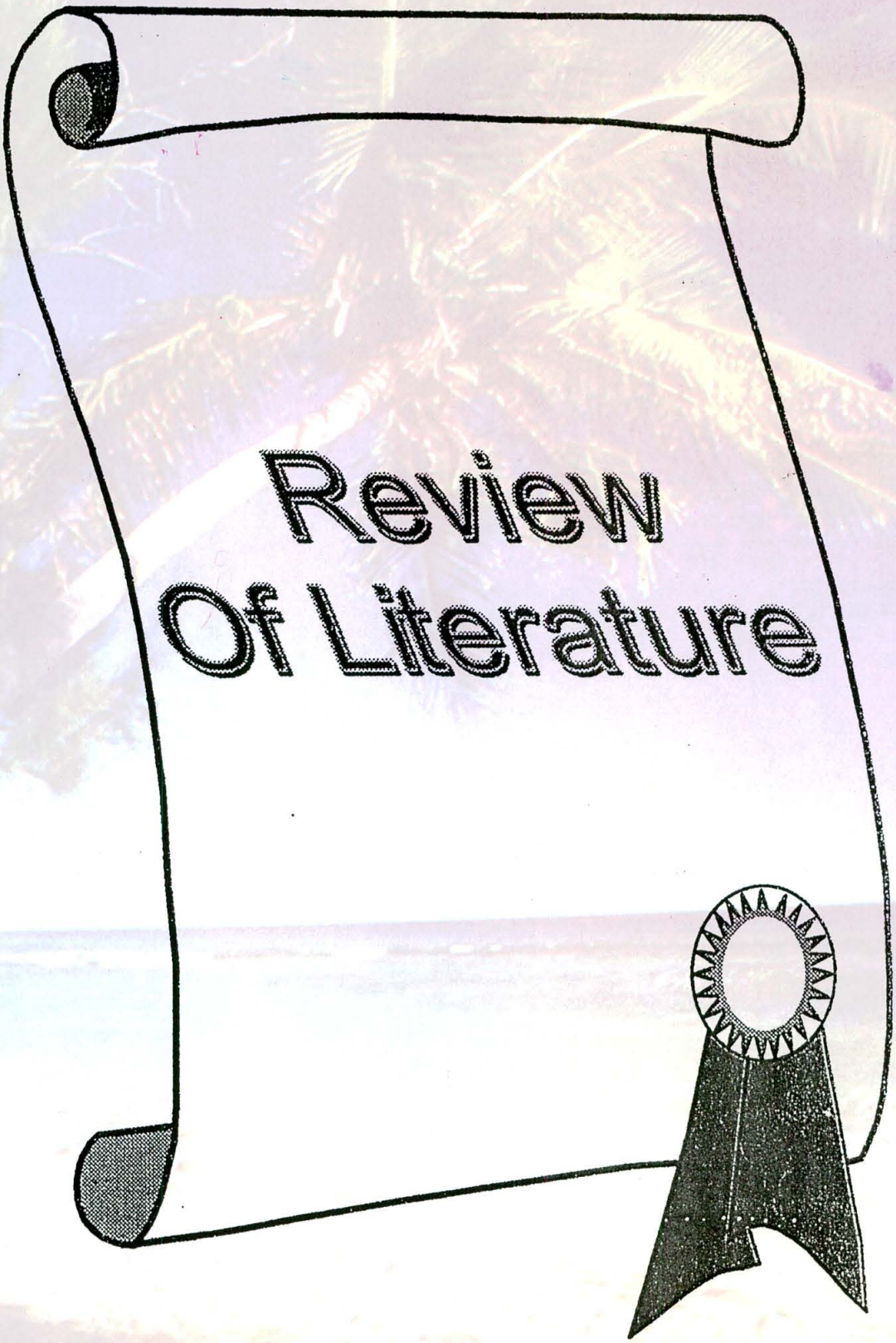
In practice, however, this ventilatory approach usually involves techniques that utilize breathing frequencies several folds higher than normal (i.e. >100 breaths/min in the adult and >300 breaths/min in the neonatel pediatric patient). When using these frequencies, tidal volume (V_T) values are usually much smaller than normal (and may be less than the anatomical dead space) and airway pressure swings are consequently less. The frequency-V_T product during HFV, however, is generally much higher than during conventional ventilation. Delivary of this pattern of ventilation is impossible with conventional ventilator valving systems and thus, HFV must be supplied with either jet injectors or high frequency oscillators using a bias flow of fresh gas[4]. The

concept that adequate gas exchange can occur with tidal volumes less than the anatomical dead space was studied by Hendreson et al.,[5] and puplished as a leading article in 1915.

It has become reasonably well accepted that HFV and more specifically high frequency oscillatory ventilation (HFOV) plays an important role in the treatment of neonates, infants and children with severe respiratory failure (RF)[6]. More than 25 years ago, HFOV was introduced as a new ventilatory technique for treating neonatal respiratory distress syndrome[7].

The clinical experience with the use of HFOV for the treatment of acute hypoxic respiratory failure in the term and near term infants, now extends over 15 years[8].

HFV is efficacious in the rescue management of infants with respiratory failure. Although each HFV system has functional characteristics that are design related, it now appears that when used with similar treatment strategies and within functional limitations, similar outcomes can be achieved. Ideally, the clinician or the operator should be familiar with the basic concepts of different HF ventilators to achieve maximal benefits using these devices in infants with respiratory failure[9].


Review
Of Literature

REVIEW OF LITERATURE

HISTORICAL REVIEW

Andreas Wesele Vesalius[10] (1515-1564), was the first to give a detailed report of modern resuscitation in 1543. He reported "an opening must be attempted in the trunk of the trachea, into which a tube of reed or cane should be put, you will then blow into this, so that the lung may rise again and the heart becomes strong. Unfortunately, lack of human adaptability delayed extensive application of this same technique for 400 years. In 1667, Robert Hooke of London[11] (1635-1703) repeated Vesalius's experiment and demonestrated that a dog could be resuscitated and kept a live by constant gas flow administered via a tracheal catheter in the absence of chest wall excursions.

Another century passed without any publications on resuscitation until in 1744 Jhon Fothergil of England reported a successful case of mouth to mouth resuscitation. In 1786 Edmund Goodwyn of London received the Gold medal of the Human Society for his dissertation on the connection between life and respiration. He speculated that respiration enabled a beneficial chemical substance to be transmitted to the blood. In 1802, E-Coleman, from Ayresline, recommended tracheal intubation and used a silver catheter. He suggested using a bellows for insufflation and added that oxygen may be beneficial. In 1887, Fell & O'Dwyer introduced a foot bellows ventilator for post-operative ventilation. In 1890, Tuffier & Hallion applied intraoperative ventilation by insufflation in