شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

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

يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of 15-25- c and relative humidity 20-40%

بعض الوثائق الاصلية تالفة

بالرسالة صفحات لم ترد بالاصل

جامعة القاهرة / كلية الطب
الدراسات العليا

محضر
اجتماع لجنة الحكم على الرسالة المقدمة من
الطبيب / أحمد عبدالعال أحمد محمود
توطئة للحصول على درجة الماجستير / الدكتوراه
فى التخدير

==========

تحت عنوان : باللغة الانجليزية :
Nitric oxide in anaesthetic practice

باللغة العربية :
أوكسيد النيتريك فى الممارسة البنج

بناء على موافقة الجامعة بتاريخ ٤ / ٨ / ٢٠٠٥ تم تشكيل لجنة الفحص والمناقشة للرسالة المذكورة أعلاه على النحو التالى :-

١. أ.د. أحمد البدوى محمود خليل استاذ التخدير طب القاهرة عن المشرفين
٢. أ.د. أحمد حلمى عبدالسلام استاذ التخدير طب القاهرة ممتحن داخلى
٣. أ.د. مصطفى فؤاد استاذ التخدير طب عين شمس ممتحن خارجى

بعد فحص الرسالة بواسطة كل عضو منفردا وكتابة تقارير منفردة لكل منهم انعقدت اللجنة مجتمعة فى يوم السبت بتاريخ ٢٩/١٠/٢٠٠٥ بقسم التخدير مدرج التخدير بكلية الطب – جامعة القاهرة وذلك لمناقشة الطالب فى جلسة علنية فى موضوع الرسالة والنتائج التى توصل اليها وكذلك الأسس العلمية التى قام عليها البحث .

قرار اللجنة :
قبول الرسالة

توقيعات أعضاء اللجنة :-

المشرف الممتحن	الممتحن الداخلى	الممتحن الخارجى
أ.د. أحمد البدوى محمود	أ.د.	

عصام

617.96

NITRIC OXIDE

IN

ANAESTHETIC PRACTICE

SUBMITTED IN PARTIAL FULFILLMENT FOR MASTER DEGREE

{ M.SC } OF

ANESTHESIOLOGY

BY

AHMED ABD EL AAL AHMED

M.B.B.CH.

UNDER SUPERVISION OF

PROF.DR.AHMED EL-BADAWY M. KHALIL

PROFESSOR OF ANAESTHSIOLOGY

FACULTY OF MEDICINE

CAIRO UNIVERSITY

DR.HANAN MAHMOUD KAMAL

ASSISSTANT PROFESSOR OF ANAESTHESIOLOGY

FACULTY OF MEDICINE

CAIRO UNIVERSITY

FACULTY OF MEDICINE

CAIRO UNIVERSITY

2005

DEDICATION

I dedicate this work to my loving family, Misoon and all my sweet friends for their help and assistance.

Abstract

Nitric oxide (NO) is a unique molecule in the human body and is responsible for normal neurologic function, vasodilator tone and modulation of the inflammatory response. Massive endogenous release of NO appears to play a central role in sepsis and the systemic inflammatory response syndrome. Inhaled NO (1-80 ppm) can markedly attenuate pulmonary vasoconstriction and improve hypoxemia due to ventilation perfusion mismatch.

However, excessive doses of inhaled NO exacerbate acute inflammation and induce lung injury by the action of NO itself or its reactive metabolites. Thus far, its use has received FDA approval only for persistent pulmonary hypertension of the newborn (PPHN). However, on an investigational basis it can be used in lung and heart transplantation and LVAD insertion. Although prospective studies have not demonstrated that inhaled NO improves outcome in ARDS, its use as a component of an algorithmic approach has achieved an impressive survival rate. Other conditions in which inhaled NO shows promise include primary pulmonary hypertension, sickle cell Anemia and hypoxic chronic obstructive lung disease.

Key word:

Nitric oxide, Anaethetic, ARDS, Pulmonary Hypertension, SIRS

Acknowledgement

First of all I am thankful and grateful to " God " the kind and merciful for helping throughout this work.

I am greatly indebted to Prof. Dr. Ahmed El-Badwy Mahmoud Khalil Professor of Anesthesiology , Faculty of Medicine , Cairo University for his continuous guidance, valuable assistance , encouragement and under his kind supervision this work has been done .

I feel a special depth of gratitude toward Dr.Hanan Mohamoud Kamal assistant professor of anesthesiology, faculty of medicine. Cairo University, who assigned and planned this work for her sincere supervision, her brilliant ideas, tremendous concern and care.

CONTENTS

Page

Introduction

The physiologic impact of nitric oxide (NO) was discovered upon the scientific community as recently as 1987, when it was determined that endothelium-derived relaxing factor (EDRF) and NO were one and the same. Hitherto, this small, highly unstable diatomic free radical was considered to be an atmospheric pollutant derived from the combustion of fossil fuel (i.e. automobile exhaust) tobacco or lightning [1]. Its concentration in the atmosphere is 10-100 parts per billion (ppb) ; in heavy traffic it is often more than 1.5 parts per million (ppm) and in the depth of a glowing cigarette it may reach 400 -1000 ppm [2].

NO is now recognized as vasodilator, a neurotransmitter [1] and an immunomodulator which plays roles in cardiovascular, pulmonary, renal [3], gastroenterologic, urologic and neurologic disease states.

The last decade has seen an exponential growth in the scientific literature and knowledge of the multiple physiologic roles of endogenous NO and its therapeutic application by inhalation in the dose range of 1-80 ppm.

This essay will provide basic review of the pharmacology of nitric oxide, the normal physiological effects of endogenous NO, and role of deficient or excessive NO production in specific disease processes.

Finally, it will review the development of inhaled NO as a therapy for pulmonary disorders, including the adult respiratory distress syndrome and pulmonary hypertension. It will also discuss its use in current anesthesia to obviate when and how to use it ?

Endogenous synthesis of NO

Nitric oxide is synthesized from the amino acid , L-arginine , by a group of flavin-containing oxygenase enzymes commonly termed nitric oxide synthase (NOS) (Fig.1) [4]. Endothelial cells were the first mammalian cells shown to release NO , a potent vasodilator . It is now accepted that various cell types can release NO and that at least three distinct isoforms of NOS exist.

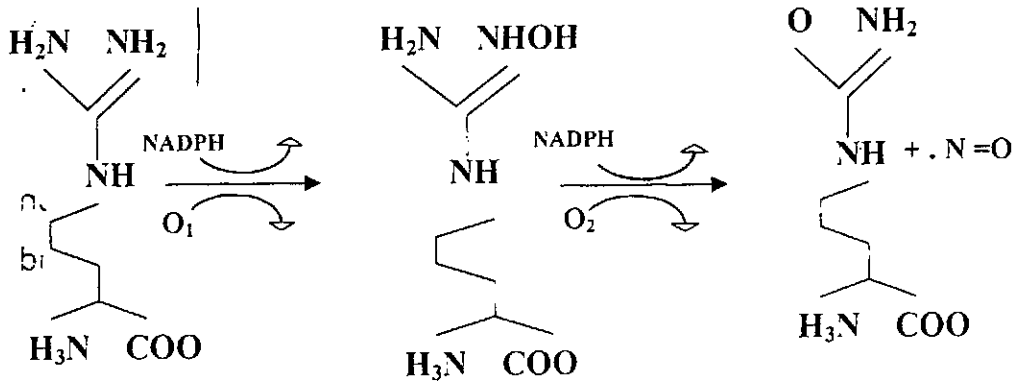

Fig.1: chemical reactions involved in the synthesis of nitric oxide . L-arginine is converted to L- citrullin and nitric oxide . the reaction is catalysed by nitric oxide synthase (NOS) in the presence of oxygen and the co-substrate nicotinamide adenine dinucleotide diphosphate (NADPH) . NOS requires several cofactors including flavones and tetrahydrobiopterin.