

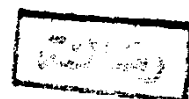
ANAESTHESIA AND RESUSCITATION
IN DIFFICULT ENVIRONMENTS

E S S A Y

SUBMITTED FOR PARTIAL FULFILMENT OF
MASTER DEGREE IN ANAESTHESIA

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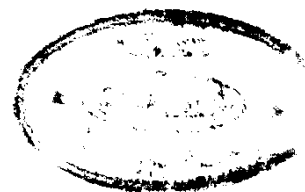
ZAKARYA MOHAMED ALI ABO EL-WAFA
M.B., B.Ch.



SUPERVISORS

DR. MOHAMED ABD EL-FATTAH EL-SAKKA
Ass. Prof. of Anaesthesiology
Ain Shams University

DR. IBRAHIM ABD EL-GHANY RAMADAN
Lecturer of Anaesthesiology
Ain Shams University



FACULTY OF MEDICINE
AIN SHAMS UNIVERSITY
CAIRO-EGYPT

1 9 8 7

وَاللَّهُ يَرْزُقُ الْغَنِيَّ
سُبْحَانَكَ اللَّهُمَّ
سُورَةُ الْمُلَقَّ ٩٦: ٥٠

سورة الملق ٩٦: ٥٠



TO

MY

FAMILY

A C K N O W L E D G M E N T

My gratitude and thanks should be submitted to my GOD for his kind support to me.

I wish to express my sincere gratitude and thanks to Professor MOHAMED ABD EL-FATTAH EL-SAKKA for his constructive supervision and also for his sympathetic help.

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INTRODUCTION

I N T R O D U C T I O N

The functions and duties of the anaesthetist , whoever he is and wherever he is working are threefolds . Firstly, he must preserve the life of the patient. Secondly, he must keep the patient free from pain. Lastly, he must produce the best possible conditions for surgery (Lee, 1969 and Boulton, 1972). Clearly, the principle object of anaesthesia is to enable operations to be done without pain (Farman, 1981A).

These responsibilities sometimes must be done in anaesthetically difficult environment. An environment can be difficult for many reasons, as physical danger, location, economy, topography, climate, availability and status of personnel and even the political situation. All of these must be considered in relation to the choice of technique, apparatus and drugs (Boulton, 1972).

In many parts of the world, anaesthesia has to be routinely administered in circumstances which are isolated or far from ideal or in which the scarcity of medical manpower makes specialization in anaesthesia impractical and economically undesirable (Boulton, 1972 and Farman , 1981A).

The standard and safety of surgery can be immeasurably improved with a relatively small degree of forethought

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and training (Boulton, 1972). Neither safe drugs nor elaborate apparatuses can ensure safe and efficient anaesthesia (Boulton and Cole, 1966A).

The efficient anaesthesia depends on the ability of the anaesthetist to do sound preoperative preparation of the patient and the available apparatus, the maintenance of a clear airway, the maintenance of ventilation before, during and after surgery, the maintenance of the volume, and composition of the circulating blood, prevention of overdosage of anaesthetics and good monitoring to the patient's pulse, Blood pressure , respiration , colour and blood loss (Boulton, 1972).

The problems of supply , economy and availability and status of trained personnel are the main problems (Boulton, 1972 and Farman, 1981A).

Thus any method employed in these situations should be simple, portable, cheap and above all safe. In many instances these criteria can be adequately met by the use of local or regional analgesia (Farman, 1981A).

But general anaesthesia is preferable in many cases e.g. operations in head and neck and upper abdomen and operations for children and infants (Farman, 1981A).

Snow (1848) believed it almost impossible for death to occur from ether administered with ordinary intelligence and attention (Farman, 1981A).

Sir Robert Macintosh and his colleagues at Oxford (Parkhouse and Simpson, 1959) have developed a system of anaesthesia employing air as a carrier gas with temperature compensated vaporizers for volatile anaesthetic agents. This system is based on the use of ether (the safest anaesthetic agent) which is unique among general anaesthetics in that it can actually stimulate both respiration and circulation making it possible to employ air. This system is cheap , portable and safe even with inexperienced hands (Farman, 1981A).

But there remains the doubt in the minds of many anaesthetists as to whether a draw-over technique with air is capable of being a qualitatively suitable alternative to those based on nitrous oxide and oxygen as a carrier gas. Such draw-over techniques are universally applicable for both cavitory and body surface procedures and it has been used to provide anaesthesia for every kind of operation including open cardiac surgery (Boulton , 1978).

REVIEW OF LITERATURE

DEFINITION AND CLASSIFICATION

A situation may be difficult for many reasons .
(Boulton and Cole, 1966A).

I- Extreme Emergency:

On rare occasions, anaesthesia may be conducted in unsuitable or dangerous locations either to save the patient life or due to immobilization of the patient e.g. man trapped by a limb in a mine (Boulton and Cole, 1966A).

The doctor will be limited to the basic drugs and equipments which he habitually carries in his resuscitation box (Hilton, 1985).

II- Location and Supply:

The situation may be isolated geographically or economically.

a) Economically:

In underdeveloped and underpopulated regions, drugs and apparatus must be carefully selected to meet the local supply (Boulton and Cole, 1966A).

b) Geographically:

In some circumstances, e.g., a ship at sea or on an expedition of exploration, isolation may be absolute, but it is possible to bring modern techniques and drugs to the aid of the patient with a little extra strain on available transport and storage space. However, the anaesthetist is

dependent on what can be carried. Very careful forethought is required (Boulton and Cole, 1966A and Magbagbeola, 1973).

In all isolated situation, the compressed medical gases are in short supply because they are bulky and heavy - resulting in difficult transport and give few anaesthetic hours in proportion to their bulk in comparison to volatile agents vaporised in ambient air (Boulton, 1978).

III - Climate:

Climatic conditions can have important effects on the choice of techniques and apparatuses. For example we need oxygen supplementation at high altitudes (Safar , 1956). Moreover, under hot and moist conditions metal or plastic apparatuses and accessories would be preferable, as rubber parts deteriorate under these conditions (Boulton and Cole, 1968B).

IV- Logistics:

If transport facilities are limited, the cylinders must be avoided. Draw-over vaporizers provides the only feasible solution (Boulton, 1978).

If the transport is by the flat footed anaesthetist, the E.M.O. apparatus (11 kg) or Huloxair apparatus (6 kg)

may be intolerably heavy (Boulton and Cole, 1966A) . In these circumstances, the anaesthetist might prefer Hewer apparatus (3.25 kg) (Hewer, 1961) or even using a resuscitation bag and I.V. drugs alone (Bovil et al., 1971 ; Prior, 1972 and Boulton, 1978).

V - Improvisation:

At unexpected eventualities, the anaesthetist may find himself without equipments, e.g. an expedition is cut off. The only solution is construction and performance of anaesthetic equipment from readily available domestic materials, e.g. Flagg's can (Boulton and Cole , 1966A).

VI- Available Personnel:

In many parts of the world, it is impossible to allow more than one medically qualified practitioner to a surgical team (Miller, 1970). In these circumstances, the surgeon may well elect to induce local or general anaesthesia himself and then leave the maintenance to a nurse (Farman et al., 1962 and Phillips et al., 1970).

In mass casualties e.g. earthquake, the surgeon passes rapidly from patient to patient carrying out immediate life

saving procedures in such a circumstance (Boulton, 1972). Ketamine may play greatly in this situation (Phillips et al., 1970). Adler and Inkster apparatus may provide a realistic solution (Adler and Inkster, 1967).

Boulton (1972) classified the difficult environments into four broad groups.

(1) Planned but Isolated Situation: This category includes the mission hospital or the ship at sea. Also, it includes circumstances where there are logistic difficulties and where climatic and topographical factors may play their part.

(2) Extreme Urgency in a Difficult and Possibly Dangerous Location. This situation may occur when a man is trapped under collapsed masonry.

(3) Disaster or Battle Conditions: This category includes the mass casualties and circumstances when groups of men are cut off from sources of supply and have to perform emergency surgery with improvised apparatus and a scarcity of drugs.

(4) Difficult Environment in Sophisticated Hospitals. This category includes anaesthesia in hyperbaric chambers and the radiology department.