History Of Inhalation Therapy
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Citation

Abstract
Ancient man discovered medicinal plants by observation and experience. Inhaling the smoke or odours of some plants was a frequent trial to get pleasure and relief of body troubles. Local therapy was the prevailing means of treatment in ancient time. So nearly all respiratory troubles were treated by one form or other of inhalation. Many types of snuffs, lotions, inhalants and insufflations were known at that time. The advent of public baths by the ancient Egyptians, which was improved by the Romans, and then well developed by the Arabs, formed a wider effective use of inhalation therapy. General inhalation anaesthesia that was firstly introduced by the Arabs got more development by the Europeans, with the introduction of the newly discovered anaesthetic gases. The highest achievement of progress of inhalation therapy began at the ninth century when the Arab physicians introduced many therapeutic agents to inhalation therapy. During the subsequent centuries more medications were added, new techniques were invented that gave wider indications for that form of therapy. The twentieth century witnessed the introduction of new therapeutic agents and higher technological devices for inhalation therapy. This has led to the development of the new medical speciality, the inhalation therapy.

INTRODUCTION
Ancient man discovered the therapeutic effect of many medicinal plants, animal materials and natural elements. He used all these substances in the form of powders, liquids, vapours or volatile oils to be taken by ingestion, sniffing, inhalation or irrigation for the treatment of his body troubles. Inhalation of drugs was an easy and low cost method; hence it got a wide use in medical therapy during that time.

The oldest known mixture used for fumigation by ancient people was the incense, which was made of a mixture of gum resins, minerals and medicinal plants. Burning of that mixture gives pleasant odour smoke that gives some comfort and relief of tension. So it was frequently burnt in temples during the religious ceremonies as a traditional custom. It was practiced indoors to allay the miasma in sick rooms and to purify air during the epidemics.

HISTORICAL REVIEW
Ancient people recognized the good therapeutic effect of many substances that were used for inhalation therapy in the form of snuffs, vapours or smoke. These substances were preserved in pottery pots and placed on pottery jars when used for inhalation.

Credit goes to ancient Egyptians for the first preparation of therapeutic materials for inhalation therapy. The inhaled material was in the form of smoke, vapour or volatile oils, obtained from the powdered dry plants or minerals, for the relief of nasal, throat and chest troubles. The most
important medical record of that time is the Eper's medical papyrus that dates back to 1550 B.C. It includes several prescriptions for the use of snuffs, vapours and smoke for inhalation for the treatment of nasal troubles.[3]

Figure 2
Figure 2: Eber’s Medical Paperyus

Figure 3
Figure 3: Queen Nefartiti offering narcotic plant to her husband Similar photo appeared in reference No [26]

The ancient Persians recognized inhalation therapy. Their most eminent physician Gumshid described the inhalation of volatile vapours for the treatment of respiratory troubles.[4]

Figure 4
Figure 4: Persian Clay Tablet

The Indians were the pioneer users of burnt Indian hemp (Cannabis Indica) for refreshment and sedation.[5]

The Greeks quoted the use of incense from the ancient Egyptians and widened its use for many other social and medical purposes. The great Greek physician Galen (130-201 A.D.) described some powdered drugs for inhalation for the relief of nasal and head troubles.[6]

The Romans were very interested in social sanitation. They established general public baths, in their large cities in which warm water was available. The evolved warm steam in such places was very helpful for the relief of body troubles.[7]
The Arab civilisation that began at the eighth century added a lot of progress to inhalation therapy. The public baths were modified to be medical centres for physical therapy and treatment of many body troubles. They introduced new medicinal plants in this form of therapy as the Eucalyptus, Peppermint, Cinnamon, Fenugreek, Black reed and the prepared liquid of Benzoin, Thymol and Violet, for the treatment of nasal, throat and respiratory troubles.\[8\]\[9\]\[10\]

Large bath tubs were used for warm water baths and clay jars or metallic pots for odour and vapour inhalation. These were heated on stove or burning wood and the evolved vapour is inhaled by the patient.\[10\]

The Arab physicians are the pioneer inventors of the general inhalation anaesthesia. The eminent Arab physician Rhazes (850-932 AD.) used the powdered narcotic plants, Opium, Hyocyamus, Mandrake and Henbane, imbibed in a sponge to be inhaled for general anaesthesia before any surgical operation.\[11\] They also introduced inhalation therapy for resuscitation of comatose patients, that was reported for the first time at the ninth century.\[12\]

The Arabic methods of inhalation therapy were quoted by the European physicians with wider use and improved techniques. Unfortunately they introduced some toxic agents for inhalation therapy as hydrocyanic acid gas, cocaine powder and tobacco that were widely used for many centuries.\[13\]

Ventilation for resuscitation was revived in Europe at the 18\textsuperscript{th} century, by using manual ventilation bellows that were
later modified to mechanical devices. Oxygen that was discovered by Lavoisier in 1777, was introduced in inhalation for resuscitation.[16] Artificial respiration by direct intubation was performed by Rudolph Mates in 1902 with positive pressure ventilation.[15]

A great revolutionary progress of inhalation therapy occurred after the midnineteenth century when the anaesthetic gases were discovered. Nitrous oxide was first used in general anaesthesia by Horace Wales in 1844, Ether for the same purpose by Robert Liston and Morton in 1846 and chloroform by Simpson in 1847. All these inhaled agents were used by the open or semi-open method with a face mask for general inhalation anaesthesia.[11,15]

**Figure 9**
Figure 9: Chloroform Inhalation Anaesthesia

**Figure 10**
Figure 10: Ether Inhalation Anaesthesia

The great advanced achievement in the knowledge and technique of inhalation therapy in the twentieth century pushed that form of therapy towards perfection. This led to the announcement of a new medical speciality – known as Respiratory Therapy - that depends mainly on inhalation therapy.[17]

**UPDATED STUDY**
The collected medical knowledge obtained through the post centuries has enriched the speciality of inhalation therapy with great progress in the technique and methods and more wider indications.

**DRUGS FOR INHALATION THERAPY**
A large group of drugs in different forms are now in use for inhalation therapy. They can be classified into the following groups:

General anaesthetics: These are a group of narcotic gases and volatile liquids, which can be inhaled for the induction and maintenance of general anaesthesia. The group includes...
Nitrous Oxide, Cyclopropane, Chloroform, Diethyl Ether, Ethyl Chloride, Halothane, Methyl Oxyfluorane and Enflurane.[21 (22) (23)]

Therapeutic gases: This group includes Oxygen, Carbon Dioxide and Helium.[21a]

Therapeutic drugs: This comprises a large group of drugs that include the Vasoconstrictors as adrenaline, ephedrine, neosynephrine, the Bronchodilators as the epindphrene, isoproternol, turbutaline, methylxanthine and prostaglandins, the Corticosteroids as cortisone acetate, hydrocortisone and dexamethasone the Immunological agents as diethylcarbamazine, chloroquine, corticosteroids and acromolyn, the Local Anaesthetics as cocaine, lidocaine, tetracaine and dyclone, the Mucokinetic agents as saline, sodium bicarbonate, deoxyribonuclease enzyme and trypsin enzyme the Antimicrobial agents as carbonicillin, cephalothin, kanamycin, neomycin, amphotericin and isoniazid, the Lung surfactants for the premature newly born infants.[14 (17)]

FORMS OF DRUG INHALATION

Different forms of drug material are now available for inhalation therapy:

Snuff powder that can be inhaled to the nose or mouth by a snuff box or a rubber pump.

Liquids, used as drops, sprays or atomization to the nose, pharynx, larynx or chest. Very fine forms of atomizers are now available for nebulization.

Vapours, these can be inhaled by inhalers, vaporizers or humidifiers.

Water steam, inhaled directly from water boilers or special devices.

Smokes of the burnt reeds, plants or minerals, evolved from a stove or a heater. The habit of Tobacco smoking in spite of its variable side effects is still prevailing in use for smoke inhalation.

Gases, this group include many therapeutic gases as oxygen, carbon dioxide, helium and nitrous oxide that are commonly inhaled for resuscitation, general anaesthesia and medical therapy.[16 (18) (19)]

METHODS OF DRUG INHALATION

Drugs can be inhaled by one or other method, according to the nature and form of the drug and the indications for its use:

Sniffing. It is the most ancient form of nasal drug inhalation that is still in use as powder or liquid inhaled from the open hand or between finger tips for refreshment or to induce sneezing. It is also occasionally used for tobacco powder inhalation.[16]

Figure 11

Figure 11: Drug Sniffing

Insufflations. This is the modernized form of sniffing using a powder blower that insufflates the powder into the nose, pharynx or larynx for decongestion, analgesia or antisepsis.

Smelling of Odoriferous substances. This is mostly practiced for research study of the sense of smell or for testing the quality of perfumes or the tobacco. These can be inhaled directly or from a special container or through an olfactometer.[33]

Tampoon application. It is the introduction of a piece of cotton or gauze impregnated with a decongestant, antiseptic or coagulant drug into the nose. It may be preceded or followed by inhalation of some drugs.

Drop instillation. Some special liquid preparations can be dropped into the nose for decongestion or antisepsis through
a dropper or a sprayer.[20]

**Figure 12**
Figure 12: Droppers and Sprayers

Inhalation. There are many devices used nowadays to convey fluid drug particles to the respiratory tract for therapeutic purposes. These can be in the form of gases, fluid, moisture or steam, inhaled through special inhalers.

**Figure 13**
Figure 13: Vapour Inhalation

Sprayers. There are devices used for particle dispersion of liquified drugs to the nose or throat. Special sprayers made of metal, glass or plastic are used for that purpose.[20]

**Figure 14**
Figure 14: Aerosol inhalation

Aerosols. This is the most updated device for fluid fine particles inhalation, through atomization or nebulization into the nose and respiratory tract. The device used for that can be a simple manual atomizer, automatic, electrical or ultrasonic nebulizer.
Figure 15: Ultrasonic Nebulization

Figure 16

References

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