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REPRIEVES BEFORE REJECTION: CHLOROFORM FOR ANESTHESIA

Anesthesiology

Dr Chandrasekhar Krishnamurti M.D. Associate Professor (Anesthesiology) NRI Institute of Medical Sciences Sangivalasa, Visakhapatnam-531162 A.P., India

ABSTRACT

Since its first use as an anesthetic by JY Simpson in 1847, chloroform enjoyed great popularity as an inhalational anesthetic for nearly 80 years. Reservations about its safety could not halt its soaring popularity. Very serious side effects including fatalities following its use were ignored and its charmed life was supported by royalty and leading public figures. This article details the reprieves enjoyed by the anesthetic until its final rejection by the scientific community.

KEYWORDS

History, anesthesia, chloroform

INTRODUCTION

The safety of anesthetics is a subject of the deepest personal interest to everyone, either for his own self or that of his friends or family. Chloroform has had a charmed life since its introduction as an anesthetic. Despite the very serious side effects associated with its use ,including fatalities in a number of instances, it enjoyed royal patronage and immense popularity for nearly 80 years.

The first narcosis with chloroform was performed by James Young Simpson (1811-1870) on himself and two guests invited for dinner on 4th Nov 1847. Simpson administered the first anesthetic using chloroform for the Mrs Carstairs in Edinburgh on 10th Nov, 1847. (1)

In India the first chloroform administration was performed on 12th Jan 1848 at Calcutta. David Waldie, the chemist who supplied medical grade chloroform for Simpson migrated to Calcutta in 1853 and started his chemical company, and lived there till his death in 1889. From that time onwards until 1928, chloroform remained a most popular inhalational anesthetic, displacing ether completely. For the lay person, it is still synonymous with anesthesia. (2)

A QUEEN INTERVENES

When Simpson used chloroform to relieve labour pains in parturients, there was widespread opposition from Calvinistic Scotland on religious grounds. They felt that it was God's intention for women to feel pain during childbirth, based on Gen. iii. 16 which states, " Unto the woman he said, I will greatly multiply thy sorrow and thy conception; in sorrow thou shalt bring forth children," The clergy felt that labour pains was "a desirable, salutary, and conservative manifestation of life-force." Others worried that surgeons would not have the experience to give the right dose or that the anesthetized subject would not know what the surgeon was doing to them while they were unconscious. The opponents dubbed chloroform as "a decoy of Satan, apparently offering itself to bless woman, but in the end it will harden society, and rob God of the deepest cries which arise in time of trouble for help."

Simpson countered these objections by showing that the proper use of anaesthetics shortened the duration of labour and, by diminishing the intensity of pain, led to more rapid and complete recovery. He drew attention to the fact that the number of lives lost yearly by the poisonous effects of opium was much greater than that lost by chloroform. He brought forward a collection of cases where patients had died on the operating table, even before the surgeon had commenced the incision. Simpson then released his famous pamphlet, entitled," Answer to the Religious Objections advanced against the employment of Anaesthetic Agents in Midwifery and Surgery," and fought his distractors with their own weapons- references from the Holy Bible. In Genesis ii. 21, it is mentioned that " The Lord God caused a deep sleep to fall upon Adam; and he slept and He took one of his ribs and closed up the flesh instead thereof." Simpson interpreted "deep sleep" as equivalent to "coma" or "lethargy." (3) While these arguments mellowed the opponents to anesthesia, Simpson's victory was won in April, 1853, when he received a letter from Sir James Clark, physician to Her Majesty, informing him that the Queen had been brought under the influence of chloroform at the birth of her eighth child Prince Leopold, and that she was greatly pleased with the result. Since queen Victoria was the Governor of the Church of England, it was 'the acceptance by the Queen herself' that changed the minds of the opponents, and " finally settled the ethics of the question'. (4,5) It was fitting that the battle royal should be won for Dr Simpson by the Queen herself', and that her subjects could not be wrong by following her example.(6) The Queen later had Princess Beatrice, her ninth and final child in 1857, with Dr. John Snow administering chloroform. Royal patronage drowned the dissent from the Church, and the social elite in London followed the Queen's lead, adding further credibility to the use of chloroform for anesthesia. (7)

The volatile agent became hugely popular and the laboratory experiments proving the dangers of chloroform were largely ignored.

A MAHARAJAH MEDIATES

The first fatality due to chloroform inhalation was a 15-year-old girl called Hannah Greener of New Castle, U.K., who died on January 28, 1848 while her toenail was being removed.(8) The fatality rate was estimated at between 1:3000 and 1:6000 with chloroform against 1: 14,000 and 1: 28,000 with diethyl ether. During the first 16 years of inhalational anesthesia, there were 393 deaths following chloroform administration against 48 due to ether during the same period. The Royal Medical and Chirurgical Society appointed a special committee in 1864 when they ruled that ether was safer as an anesthetic as overdosage stopped the respiration, first permitting resuscitation, whereas chloroform overdosage stopped the heart before respiration by cardiac syncopy. (9) The London school supported the celebrated French physiologist Claude Bernard, who opined that chloroform killed by paralyzing the heart directly whereas the Edinburgh, school endorsed the distinguished surgeon Prof Syme, that chloroform killed by paralyzing the respiration, and that the heart arrested secondary to asphyxia. John Snow also supported Syme by stating "the fatal result should be attributed to the action of the chloroform on the nervous centers having extended so far as to put a stop to respiration." (10,11)

Edward Lawrie, Principal and Chief Surgeon, Hyderabad Medical School (Osmania), who had administered chloroform for 20 years to thousands of patients without any incident, supported the Edinburgh school. But, out of his reverence for Prof Syme's teaching, he moved for the appointment of the first Chloroform Commission in 1888 to inquire into the safety of the volatile anesthetic in humans. The same was generously funded by His Excellency the Nizam VI, Mir Mehboob Ali Khan. A surgeon Patrick Hehir was President while Dr A Chamaretes and JA Kelly were members. They studied chloroform toxicity in dog experiments and concluded that the agent was safe, if due attention was paid to respiration, as respiration appeared to have given out before the heart in a majority of cases studied. (12)

The editor of Lancet did not accept extrapolation of animal experiments to humans, and was of the strong opinion that chloroform caused primary syncope and cardiac failure. Lawrie refuted this argument by stating that primary syncope was the result of fear, dread or loss of inhibition after inhalation, especially if alcohol was consumed pre operatively and that cardiac toxicity was always secondary to hypoxia.(13)

To settle matters, the Second Chloroform Commission (The Lancet Commission) was appointed, again under the sponsorship of the Nizam, with Dr. T. Lauder Brunton as Lancet's representative. He arrived on 21st October 1889 to participate in the deliberations of the Commission as an expert and supervise the experiments being conducted at the Afzalgunj Hospital (Osmania General Hospital) in Hyderabad by the students of Hyderabad Medical School (Osmania Medical College). Experiments were conducted on dogs and monkeys to study the action of chloroform on the heart and respiration and the final report stated that the danger from chloroform is asphyxia or overdose: none whatever heart direct. (14) The Lancet reported that the figures 'would seem to show that from the clinical standpoint, heart failure is the commonest form of death from chloroform.' (15)

The Special Chloroform Committee of the British Medical Association (sometimes referred to as the "Third Chloroform Committee") constituted in 1901 with Dr Augustus Desire Waller, F.R.S. (1856-1922) of St Mary's Hospital, London, as first chairman, Professor Charles Sherrington FRS, Sir Victor Horsley FRS, Dr William McCardie, anesthetist of Birmingham, Dr Dudley Buxton as secretary, Augustus Vernon-Harcourt and Professor Dunstan as co-opted members, sat for nine years and produced a long and comprehensive report in 1910, recommending two per cent vapour of chloroform as a maximum dose for adults during induction. (16)

In 1902 E H Embley, under the direction of Professor C J Mortimer, insisted that vagal inhibition (in dogs) was the 'great factor in the cause of sudden death under chloroform' and that atropine premedication would preclude this.(17)

In 1911, A Goodman Levy, described 'a hitherto unrecognized form of sudden cardiac failure which occurred in cats under chloroform. (18) The 1912 Committee on Anesthesia of the American Medical Association opined that 'the use of chloroform for major operations is unjustifiable,' and dealt the final blow to chloroform.(19)

A MAHATMA GOES 'UNDER' :

Chloroform received a further reprieve when, on the night of 12 January1924, amidst a violent thunderstorm, the Mahatma was operated upon in Sassoon Hospital, Poona, by Colonel Maddock for acute appendicitis with Dr. Date administering chloroform by open drop method. The electric light fused during the operation and the surgery had to be completed under torchlight initially and when that too failed, by the light of hurricane lamp! (20) Chloroform's use as an anesthetic continued in India until early 1970s.



CONCLUSION

Dr. M. C. Ganguli from Calcutta observed the leniency of coroners to chloroform related deaths in 1928, but the reservations about the safety of chloroform as an anesthetic could not halt its soaring popularity. Between about 1865 and 1920, chloroform was used in 80 to 95% of all anesthetic administrations.

The introduction of gas anaesthesia using nitrous oxide, improved equipment for administering anaesthetics and the discovery of hexobarbital in 1932 led to the gradual decline of chloroform narcosis. In 1947, Ralph Waters attempted to reactivate chloroform, but failed. The story of the clinical use of chloroform ended in 1976 with the second edition of V. J. Collins' textbook.

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