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Editorial

Evolution of Anaesthesia

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E D I T O R I A L

Anaesthesia or anesthesia in Greek means “without sensation” (“an” meaning “without” and “aesthesis” meaning “sensation”); the term was coined by Oliver Wendell Holmes in 1846. It is a state of controlled, temporary unconsciousness created by administration of drugs, which allows medical and surgical procedures to be undertaken without causing undue distress or discomfort, both to patient and surgeon. It also includes analgesia and muscle paralysis. With the advent in science and technology, early diagnosis and treatment has led to increase in invasive interventions. Also, with increase in patient awareness, available information on Internet, every patient wants their invasive intervention without any stress and pain and, thus, increases need of anaesthesia/ sedation. Today, anaesthesia is a part of almost every clinical speciality, either demanding general or local anaesthesia. Even for insertion of intravenous cannula, patient demands local anaesthesia to avoid undue stress but this was not the case a century ago.

Past

History of anaesthesia is only two centuries old in comparison to its counterpart surgery which goes back up to the time of Sushruta (6th century BC). In the middle of the nineteenth century, surgery was the last resort to treat any health issue, because it was performed on an awake patient. Conscious patient with unimaginable pain and agony, always fighting while under a procedure without any monitoring and considerable risk, was a stressful situation for both patient and surgeon. Fanny Burney,[1] a popular English novelist, who underwent mastectomy in 1811 says that

“When the dreadful steel was plunged into the breast … I needed no injections not to restrain my cries. I began a scream that lasted for ever during the whole time of the incision … so excruciating was the agony … I then felt the knife against the breast bone-scraping it.”

Even a surgeon John Abernethy, at London’s St Bartholomew’s Hospital compared walking to the operating room to *“going to a hanging.”*[1]

It was only after 16 October, 1846, (also known as Ether Day) when a young US dentist named William Morton first successfully anaesthetised a young male patient using ether in a public demonstration at Massachusetts General Hospital, anaesthesia came into practice relieving both patients and surgeons. Since then, anaesthesia has evolved to such an extent as today we are talking about robots and artificial intelligence in anaesthesia.

In 1853, John Snow gave successful anaesthesia using chloroform to Queen Victoria during the birth of Prince Leopold. Although chloroform is free of ether's flammability and consequent explosion hazard, it is not pharmacologically safe, leading to its fall in popularity for anaesthesia very soon. Since then new inhalational gases are continuously on development and improvement for conduct of safe anaesthesia.

After ether, there has been a continuous introduction of new inhalational gases like nitrous oxide and halogenated compounds like halothane, sevoflurane, desflurane. All of these gases have wonderful ability of maintaining adequate depth of anaesthesia, hemodynamic, with minimal complications. Today, ether and chloroform have been replaced by much safer and more effective agents such as sevoflurane and isoflurane.

Earlier anaesthesiologists used to carry heavy, bulky cylinders and equipment of airway for giving anaesthesia. But, in 1917, a British anaesthetist Henry Boyle, invented continuous-flow machines "Boyle's machine" which dramatically changed the conduct of anaesthesia practices. It consists of cylinders for oxygen, vaporizers for inhalational gases, breathing circuit all in one assembly. Over the time basic boyle's machine has also evolved into an automatic machine which apart from having a ventilator also incorporated various monitoring devices like capnograph, oxygen concentration, and the like. Some of the important historical landmarks in development of anaesthesia have been listed below:

Milestones in History of Anesthesia			
Events	Year	Jackson Rees Circuit	1937
Ntrous Oxide	1733	Mcintosh Laryngoscope	1943
BP instrument and measurement	1733	Lumber Puncture Needle	1945
Mouth to Mouth Resuscitation	1744	Anesthesia Association of Great Britan and Ireland	1946
Anesthesia word came in Dictionary	1751	halothane	1951
Oxygen	1794	IPPV	1952
Nitrous Oxide in Use	1799	Mapelson Circuit	1954
Morphne	1805	Cricoid Pressure	1961
Lumber Puncture done	1842	Ketarnine	1962
Sub Cutaneous Injection Given	1845	MAC	1963
First Ether Anesthesia Given	1846	Bupivacaine	1965
Artificial Respiration Started	1856	Pulmonary Artery Catheter	1970
First Anesthetic Pharma Comp. (Squibb Pharma USA)	1858	Elomidate	1975
Open Drop Anesthesia (Schimmelbusch Mask)	1862	Propofol	1977
Anesthesia Chart	1869	Isoflurane	1980
Synthetic Mirphine by Bayer	1874	Laryngeal Mask Airway	1980
Cyclopropane	1881	Pulse Oxymeter	1980
Cocaine	1884	CPAP	1982
First Spinal Anesthesia given by Bier	1897	Atracurium	1983
Caudal Analgesia	1901	Ondensetron	1984
Ethyl Chloride	1903	Vecuronium	1984
Apgar Score	1909	Mallampatti Classfication	1985
Inhalation Anesthesia	1910	Desflurane	1987
Boyle's Machine	1917	Sevoflurane	1990
Endo Tracheal Tube (Magli)	1919	Capnography	1991
Magil's Forcep	1919	McCoy Laryngoscope Blade	1993
Anesthesia and Analagesia	1922	BIS	1994

British Journal of Anesthesia	1923	USG for Nerve Blocks	1999
Cuffed Endo Tracheal Tubes	1931	Video Laryngoscope	2001
Suxamethonium Chloride	1932	Spectral Entropy Monitoring	2003
Association of Great Britan Anesthelist	1932	I gel	2007
American Society of Anesthesiologist	1932	Sugammdex	2008
Guedel's Airway	1933	Robotic Anesthesia	2012
Sodium thiopental	1933	Computer assusted Anesthesia (Sedasys Machine)	2015
First Diploma of Anesthesia	1935	Smartphone Anesthesia	2016
		Compiled By Dr. Tushar Chokshi	

Though the agents like nitrous oxide were discovered as early as 1733, their use in anaesthesia was possible only after Ether Day. The practice of general anaesthesia has now evolved to the point that it is among the safest of all major routine medical/surgical procedures. Today, we talk about different types of anaesthesia like general (total unconsciousness), local (loss of sensation in a locally defined area) and regional (loss of sensation to a particular part of body by blocking the nerves supplying it). Anaesthesia machines as advanced as that apart from providing controlled concentration of inhalational gases, they have incorporated monitors for respiratory mechanics, hemodynamic monitoring and, in fact, are augmented by monitors for depth of anaesthesia, pain (nociception), cardiac output.

Present

Anaesthesia machines with Wi-Fi, bluetooth and USB port for data collection, and remote operating control are in use at present. The Sedasys is an FDA-approved robotic anaesthesia machine for exact delivery of drugs for sedation in procedures like colonoscopy, endoscopies, and the like. Tele-anaesthesia has been introduced for control of anaesthesia from remote locations using automated anaesthesia machines. Smart phone applications have a profound role in this context. A robotic system named the Kepler intubation system has been developed for intubation and thus managing difficult airways. Though these advancements are not in common use but possibly in a decade or so, we may find their rapid increase worldwide. In fact, use of ultrasound in anaesthesia has also changed the approach of anaesthesia practices especially for regional anaesthesia by locating nerves and thus precise nerve block leading to maximum effect with minimum dose of drugs. Use of ultrasound for lung volume measurement, vascular access has increased a lot in last decade and it will keep on replacing the blind procedures to make them more efficient.

Future of Anaesthesia

Though initial introduction of technology has started changes in anaesthesia practices, day is not far when we will be routinely using smart phone anaesthesia practices, tele-anaesthesia worldwide, robotic anaesthesia, nanotechnology in anaesthesia, CLAD-closed-loop anaesthesia delivery system (an automated device which delivers and controls anaesthesia in accordance with body mass index, intraoperative depth of anaesthesia, patient hemodynamic and its response to drugs) and, of course, of artificial intelligence. All these technologies are already available in various other fields of science. It is just a matter of time till they fully transform anaesthesia, coining and introducing a new branch in medicine-automated anaesthesia where everything is automated and controlled by artificial intelligence, providing anaesthesia and preventing any untoward complication to patient changing the world of anaesthesia. But remember, auto-anaesthesia cannot replace the real anaesthetist who works behind the curtain to make the life of surgeon and patient easy, it will only improve his efficiency to provide anaesthesia.

References

1. Liley D. A short history of anaesthesia: from unspeakable agony to unlocking consciousness. May 2, 2017. http://theconversation.com/a-short-history-of-anaesthesia-from-unspeakable-agony-to-unlocking-consciousness-74748. Last accessed on 30/01/2020.