

Evolution of Obstetric Sonography

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Editorial

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Editorial

Today, Ultrasound has become an indispensable tool in practice of Obstetrics and Gynecology. It is presently the safest and most readily available diagnostic modality to evaluate fetal health and intrauterine environment. Almost every mother undergoes it. But, 60-years ago, when its role was first suggested for this purpose, it seemed like a ridiculous idea and was met with intense scepticism. The development of Diagnostic Ultrasound as a modality and its popularisation in the field of Medicine and Obstetrics is an incredible story that I reckon befitting for the inaugural edition of this journal.

The Titanic sank in 1912. Soon after that, various underwater navigation systems started to develop using Ultrasound to measure underwater distances. The first SONAR (sound navigation and ranging) system developed in 1914 by Reginald which soon became popular and was widely deployed in First World War in surveillance of German U- boat and Submarines. Ultrasound soon found another use with the development of ultrasonic metal flaw detectors by the Soviet scientist Sokolov in 1928. The first medical application of sonography was a therapeutic one rather than diagnostic. The destructive properties of High intensity focussed ultrasound were recognised by Lange in 1920s which gradually led to its development as a neurosurgical tool used in ablation of Basal ganglia (in Parkinsonism), frontal lobe tissues (pain management in carcinomatosis) and various non neurological disorders. Dussik brothers were the first physicians to apply sonography (hyperphonography as they called) for diagnostic purpose locating brain tumors and cerebral ventricles by measuring the transmission of ultrasound beam through the skull in papers published in 1942 and 1947. What followed was a flurry of research paper exploring the diagnostic utility of sonography in the evaluation.

The beginning of application of Ultrasound in the field of Obstetrics and Gynaecology can be traced to a classic paper by Ian Donald and his colleagues in the Lancet in 1958 titled "Investigation of abdominal masses by pulsed ultrasound", which is probably the most important paper on medical diagnostic ultrasound ever published [1]. This paper demonstrated the life saving potential of this technique through a case of ovarian cyst in a woman diagnosed on Sonography, previously rendered as having inoperable carcinoma of stomach. Besides that, the paper brilliantly discussed the physics, technique, safety, strength and limitations of ultrasound. Ian Donald later contributed several important papers demonstrating diagnostic applications of ultrasound in obstetrics and gynaecology [2]. He was the first to describe the concept of 'blighted ovum'. It is interesting to know that before taking up obstetric practice in London, he was in Royal Air force where his interest in machines grew. I feel noteworthy to mention that he had received a gallantry decoration in RAF for rescuing a pilot from a burning aircraft with bombs still within it, speaking volumes about his character. Donald and Brown collaborated to produce 'Diasonograph' which gained wide popularity and was commercially produced. In 1960s there was a boom in production and research on sonographic equipments. In 1968 Siemens® produced the first real time Ultrasound scanner 'Vidoson' which was widely employed in Germany and other centers of Europe. Doppler applications of obstetrics started in Japan with the works of Satomura in early 1950s and much of the research was relatively unknown to the west initially because it was published in Japanese language. Continuous wave Doppler began in the early 1970's in Japan leading to detection of fetal cardiac motion. Namekawa and Kasai from Japan, working with Aloka®, developed the first colour Doppler machine in 1980s. 3D visualisation of the fetus first started by the multiplanar scanner developed by

Tom Brown in 1974 in Glasgow. A decade later Baba in collaboration with Aloka® produced first 3D sonographic system. First real time transvaginal probe was developed in Austria by KretzTechnik® in 1985 which soon had profound impact on gynecological diagnosis and early gestational assessment.

In 1969, the first world congress on Ultrasound diagnostics in Medicine was organised in Vienna which was attended by pioneers of this newly developed modality. This was soon followed by increasing publications in the field of diagnostic sonography. Stuart Campbell from King's College Hospital in London, with his colleagues published various landmark articles describing the techniques of fetal biometry which were instrumental in establishment of routine sonography in pregnancy. Grennert et al. first published data about benefits of routine ultrasound screening of a pregnant population. The first national Sonographic screening program in routine pregnancy was adopted by Germany. Hobbin's paper on the role of Ultrasound in the diagnosis of congenital anomalies and Nicolaides' work on sonographic measurement of nuchal translucency in screening for chromosomal anomalies were the pioneer researches on fetal anomaly scan that has become an important diagnostic tool in modern day obstetrics. Ultrasound has contributed immensely to the way Obstetric care has evolved. Obstetric Sonography has evolved today to a point that was probably beyond the imagination of its early pioneers. NASA has developed a virtual guidance program for astronauts to perform sonographic examinations in space. Even iPhone has a tele-sonography app. However, behind all these advancements there were various ingenious stalwarts without whose innovative ideas and dedication this scientific advancement would not have been possible. This article, although misses out on many names which played pivotal role in the inception of this technology, is an attempt to explore the concise historical timeline of obstetric sonography.

References

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