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Opinion

ISUOG at 30 years: looking back to the future

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Thirty years of ISUOG. More than a generation. I was there at the baptism, 30 years ago. Having been Prof. Campbell's Fellow for several years, I could not miss the event. I still remember vividly that first ISUOG World Congress at the Queen Elizabeth II Conference Centre in London: the thrill of listening to and meeting in person the holy monsters of ultrasound, the already famous and the famous-to-be. I remember Beryl Benacerraf describing the complete ultrasound picture of the most common trisomies, Kypros Nicolaides discussing fetal physiology based on cordocentesis data, and much more. The newly founded ISUOG was then a small society of ultrasound geeks, gathering to exchange their experience of the most sophisticated diagnoses. In the first issue of *Ultrasound in Obstetrics & Gynecology*, Prof. Campbell wrote that Ian Donald's child was coming of age, implying that the ultrasound technique had reached adulthood, and, to celebrate this, ISUOG and its Journal were born. In that first issue were discussed such subjects as flow over the foramen ovale in relation to fetal breathing movements and total fetal activity *vs* biophysical profile in predicting intra-amniotic infection in premature rupture of the membranes, along with many others[1].

What have been the milestones of ultrasound in obstetrics, my discipline and also the essential ingredient of fetal medicine, in the last 30 years? Ultrasound made it possible to see into the 'black box' that the pregnant uterus had been until then. It was no surprise that growth and activity of the developing fetus, together with amniotic fluid quantification and placental location, were among the first subjects of scientific interest. Fetal biometry and the study of fetal body and breathing movements stimulated much research. Then it became possible to recognize fetal anomalies. Anencephaly had already been described, in 1972, but, as resolution improved, the patterns of an increasing number of fetal anomalies were recognized. Attention was quickly focused on the so-called 'sonomarkers', easy clues to diagnosis, even for non-experts. Among others were the famous 'lemon' and 'banana' signs[2], but the 'mother of all markers' was undoubtedly nuchal translucency (NT)[3], described in the early 90s and established by Kypros Nicolaides as the essential component of algorithms for trisomy screening. Thirty years later, NT is still measured in most countries worldwide.

Neurosonography and fetal echocardiography became, in their own right, independent disciplines in the realm of ultrasound, and techniques such as magnetic resonance imaging became an essential complement in the diagnostic workup of many anomalies. In parallel, advances in genetics and rapidly evolving techniques made it possible to diagnose prenatally ever more conditions and to recognize prenatal presentation of many genetic syndromes. Moreover, with the possibility to study non-invasively the fetomaternal circulation using Doppler, evaluation of the blood supply to the uterus and recognition of fetoplacental blood-flow patterns in growth restriction and fetal anemia became essential parts of modern obstetric care. Furthermore, correlations between Doppler indices and fetal blood-gas levels clarified the pathophysiological background to our observations on the Doppler spectrum[4].

Then came the era of evidence-based medicine and, increasingly, meta-analyses populated the pages of the White Journal. This was a scientifically healthy trend, with positive side effects for the Journal's impact factor. Still, many in our community miss the original Journal, focused primarily on ultrasound.

Fetal surgery became another subdiscipline of paramount importance. Intrauterine blood transfusion under ultrasound guidance in fetal anemia and recognition of the stages of twin–twin transfusion syndrome enabled two major sources of fetal loss to be reduced. Ultrasound could support interventions such as laser coagulation of vascular anastomoses[5], prenatal correction of spina bifida[6] and, more recently, endotracheal occlusion in cases of diaphragmatic hernia[7]. Ultrasound became instrumental in curing, not just preventing the birth of, affected babies.

The discovery of fetal cell-free DNA (cfDNA) in the maternal circulation was a major turning point, creating tremendous opportunities for women (and industry) and, in many ways, overshadowing the use of ultrasound in early pregnancy. In the meantime, advances such as three-dimensional (3D) ultrasound, transvaginal sonography and the ever-improving resolution of ultrasound systems enabled assessment of fetal anatomy increasingly early in pregnancy[8].

Pre-eclampsia can now, largely, be prevented by Doppler screening and aspirin administration[9], early growth restriction can be managed optimally[10], and the risk of preterm labor can be reduced by cervical-length measurement[11] followed by various preventive strategies.

Over the past 30 years, ISUOG has become the undisputed leader in setting standards and providing education in the field of ultrasound in obstetrics and gynecology, and the Society has grown to over 15 000 members. More recently, it has become clear that the only way to improve fetal and maternal outcomes worldwide is by teaching the correct use of ultrasound from the outset and, if possible, in every corner of the world. Basic Training has become the core of ISUOG's teaching activities and the recipe to fulfill its mission to ensure that all women in the world are scanned by competent sonographers. Simulation makes it possible to teach scanning without need of a patient, and the digital era, catalyzed by the recent pandemic, has taught us that, although less palatable than the traditional face-to-face way, education can also be disseminated globally effectively and at low cost through the worldwide web.

What can we still expect of ultrasound and fetal medicine in years to come? Has the goldmine of these disciplines, exploited intensively for the last 30 years, now run out? Will artificial intelligence (AI) provide us with the diagnosis of anomalies after analysis of a 3D volume along with magnetic resonance images? Will it resolve the problem of inaccuracy and inter- and intraobserver variation in all kinds of measurements? Will cfDNA pick up more and more genetic aberrations and make looking at the fetus obsolete? Will it be possible to cure diseases *in utero* by correcting inborn genetic errors with techniques such as that using the clustered regularly interspaced short palindromic repeats (CRISPR)-Cas9 system? Will we eventually transform from terminators into curers, faithful to our true vocation? Let's look with trust to the future and embrace it, without fear of being soon out of business. After all, even with the most sophisticated technology, there is an element that cannot be substituted, namely, the human factor. The capacity to look into a woman's eyes, to explain to her and her partner the condition affecting their baby, to review the options and guide them through the emotional rollercoaster that the diagnosis of an anomaly entails, will always need a human touch.

I have recently reached the age at which, in The Netherlands, I am compelled to retire from my university appointment; still, I feel strongly that my professional life remains unfinished business. I look back with pride and gratitude, but also humbleness, through these past 30 years, during which I had the honor, having been a disciple of great minds, to become, ultimately, the leader of our Society. ISUOG and all the great people working in its headquarters have become my family and, through ISUOG, my circle of friends has grown tremendously. I have had the great privilege of witnessing this era from its inception to . . . the new future. How lucky I am.

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