Referral ultrasound in fetal medicine: May telemedicine play a pivotal role?

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Fetal ultrasound scan is a standard care of monitoring pregnancy, and it is performed during the three trimesters mainly finalized to date pregnancy and detect fetuses an increased risk of chromosomal anomalies (first trimester), rule out structural anomalies (second trimester) and fetal growth third trimester. To ensure a uniformity of screening, sonographers are usually required to adhere to established national or international practice guidelines. Such scanning guidelines usually comprise a checklist of standard planes, structures, and anatomies to be surveyed. Hence a deviation from the norm is evidenced is mandatory to perform a detailed examination locally if the center has the expertise and facilities to manage the specific suspected abnormal condition it is necessary to send to a referral unit.

In this issue of the Journal Wang et al. retrospectively analyzed the referral from 24 hospitals in China to a tertiary prenatal diagnosis. They evaluated 2000 referral and found an overall agreement between the primary suspect and the final diagnosis of approximately 50% with the lowest agreement for the fetal brain referral (34.8%). Further, the rate of discordance was low during first trimester and increased during the second and third trimester.

For pregnant women and their families, the need of referral increase anxiety and may involve traveling long distances and incurring costs due to loss of earnings, childcare and travel. These limitations make telemedicine an attractive option for diagnosis and second opinions. Telemedicine connections have proved to be an efficient way of delivering tertiary care services to underserved areas and recent studies have shown fetal ultrasound consultation by telemedicine to be technically feasible and welcomed by clinicians and patients. This approach has been recently successful tested during SARS-CoV2 pandemic.

Referral may be performed by a remote fetal tele-ultrasonography service, which enables to transmit live images over high broadband internet connection to an attending fetal maternal specialist at an external facility (Figure 1). This allows instant feedback and counseling via audio or both audio and video. A second possibility is to send by internet volume datasets acquired by three- or four-dimensional (3D, 4D) ultrasound. This approach has the advantage of requiring standard internet connection and allows to the referral center to analyze data off-line with an easier schedule of the internal workflow organization. There are evidences on the possibility of obtaining, in peripheral hospitals. Volumes of high enough quality to allow satisfactory diagnostic evaluation of the fetal brain and heart. Further, it has been demonstrated the ability of referral centers in performing an accurate and differential diagnosis of complex anomalies.

The next step to standardize the indication for referral is the use of artificial neural networks. These systems are particularly prone to image pattern recognition and have been utilized to improve the speed and accuracy of diagnosing patient conditions in medical fields that heavily depend on images and video, as in the case of fetal ultrasound. Using the power of deep learning to automatically check the quality of the ultrasonographic examination has the potential to increasing sonographer efficiency, improving human-computer interfaces with ultrasound machines that may reduce the number of referrals.
In conclusion, telemedicine provides a reliable and feasible option for the delivery of ultrasonographic consultations to women without the need to travel to a fetal medicine referral unit. This approach is valued by women and staff and reduces family costs. There is clear evidence of the advantage to develop and promote the use of the telemedicine link within the provision of specialist in maternal fetal medicine to manage high-risk pregnancies.

CONFLICT OF INTEREST
The authors declare no conflict of interest.

DATA AVAILABILITY STATEMENT
No research data are shared.

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REFERENCES

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