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WS80A with Elite

Three-dimensional sonographic virtual cystoscopy in a case of abnormal invasive placenta

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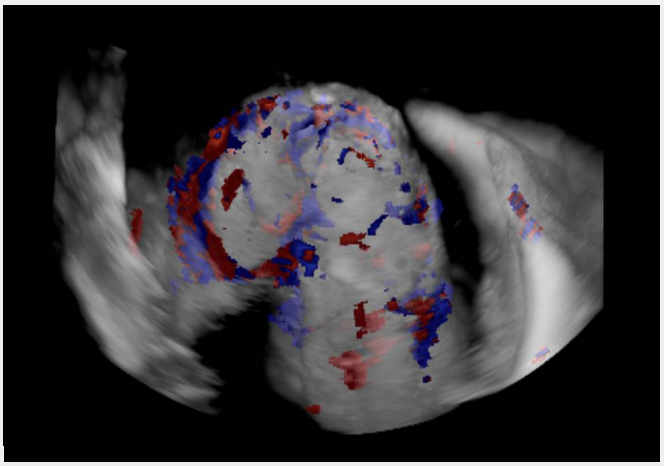

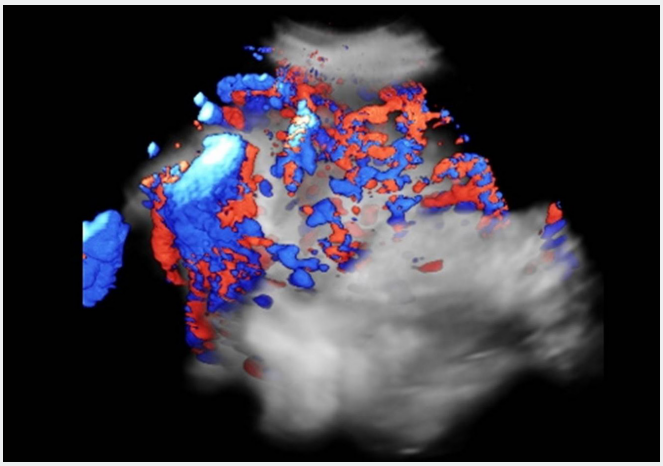

" 3D sonographic virtual cystoscopy with <Samsung WS80A with Elite> shows a widespread vascularization of the uterine serosa-bladder interface with an unharmed bladder mucosa (early percreta). "

Introduction

The three forms of abnormal invasive placenta (AIP) accreta, increta and percreta, are emerging obstetrical pathology. Over the last 50 years, the incidence of AIP has increased 10 fold with a reported rate of one case every 2500 deliveries.[1] Recent data indicate an incidence of one case per 533 pregnancies.[2] The increased incidence of AIP correlates with the increased rate of cesarean section deliveries,[3] which represents the main risk factor. AIP increases the likelihood of significant maternal /neonatal morbidity and mortality, especially if diagnosed at delivery. Attempts to remove the placenta can cause severe life-threatening bleeding. Prenatal diagnosis of AIP using ultrasound and/or magnetic resonance imaging in high-risk populations is feasible, and can improve both maternal and neonatal outcomes via a delivery planning process led by an experienced obstetric team including anesthesiologists, senior gynecologists, neonatologists urologists and interventional radiologists.[4-5] Several authors have reviewed the diagnostic accuracy of sonographic criteria for placenta accreta.[6-10] Three-dimensional (3D) Doppler ultrasound could represent a turning point for diagnosis of abnormal placentation,in particular in differentiating placenta percreta between the less severe forms of AIP, (i.e. placenta accreta and increta).[10-11]

In case of placenta percreta preoperative knowledge of the degree of bladder invasion is key to safe and successful surgical management of MAP: in some cases, cystectomy with preoperative insertion of ureteral stents. Moreover, in some cases of severe placenta percreta, depending on the degree of bladder invasion, conservative treatment without hysterectomy is feasible.

In this series, we report a new sonographic technique to evaluate the degree of vascularization in the case of placenta percreta.

Case Series

In a serie of 8 patients with an ultrasound prenatal diagnosis of placenta percreta (Figure 1, Table 1), we performed a three-dimensional sonographic virtual cystoscopy to analyze the vascular topography of the uterine–bladder interface. In particular, we carried out a targeted 3D transvaginal examination using Samsung ultrasound WS80A and its features, S-Flow™ and power Doppler, with the bladder filled to 300 mL which we consider optimal for evaluating the uterine–bladder interface. Following volume acquisition, we analyzed the image on the ultrasound monitor using the Sonoview software (Figure 2, 3) and were able to determine that the posterior bladder wall was contiguous with the abnormal site of placental insertion. Using 3D sonographic virtual cystoscopy, we may be able to obtain informations on posterior bladder wall contiguous to the abnormal placental site insertion. Traditional cystoscopy showed a submucosal bladder vascular network with the integrity of the bladder mucosa, but the extent of vascularization is not seen in detail and information about the uterine serosa–bladder interface is not discernible.

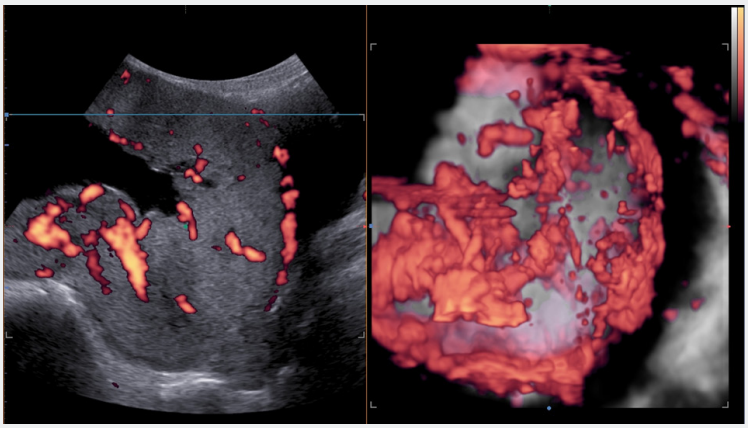

Figure 1. Three dimensional power Doppler in case of placenta percreta. This image shows the irregular intraplacental vascularization with tortuous confluent vessels crossing placental width.

Patient	Age (ys)	WGA at diagnosis	WGA at delivery	Bladder / Ureteral lesions	Operative time(min)
1	37	15	35 + 0	None / None	90
2	32	21	34 + 3	None / None	75
3	40	17	33 + 5	None / None	100
4	31	23	34 + 5	None / None	85
5	28	25	35 + 2	None / None	110
6	43	18	32 + 5	None / None	80
7	36	16	33 + 6	None / None	90
8	38	23	34 + 5	None / None	100

Table 1. Demographic characteristics of patients. (WGA : weeks' gestational age)

In these eight cases of placenta percreta, the view of the vascularity in placenta basal layer underlying the bladder wall by means of virtual cystoscopy, allow us to assess the infiltration degree early, before perforation of the bladder mucosa. This information has allowed us to perform the cesarean hysterectomy at early stage of placenta percreta without any bladder or ureteral lesion.

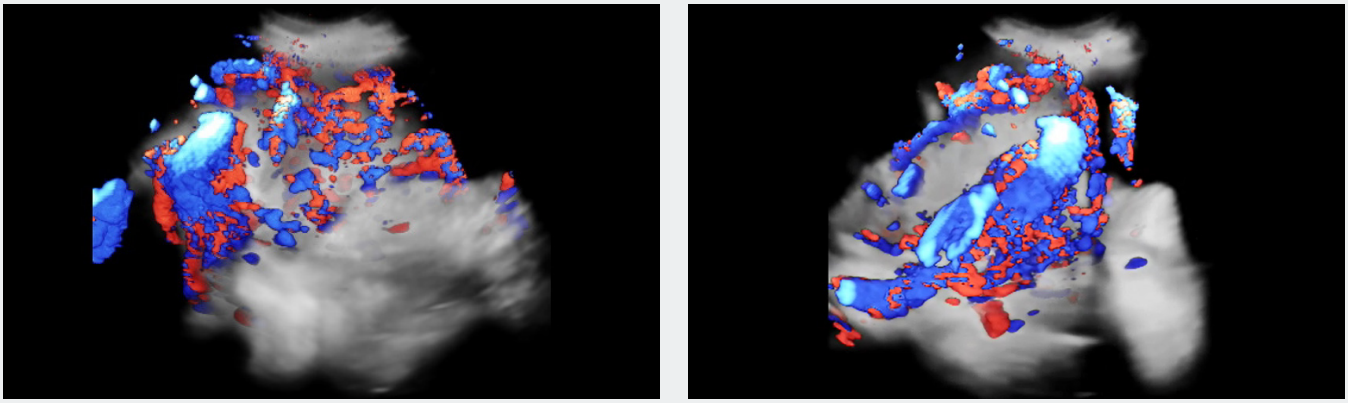

Figure 2. Placenta percreta: the vascularity of the basal layer of the placenta underlying the bladder wall

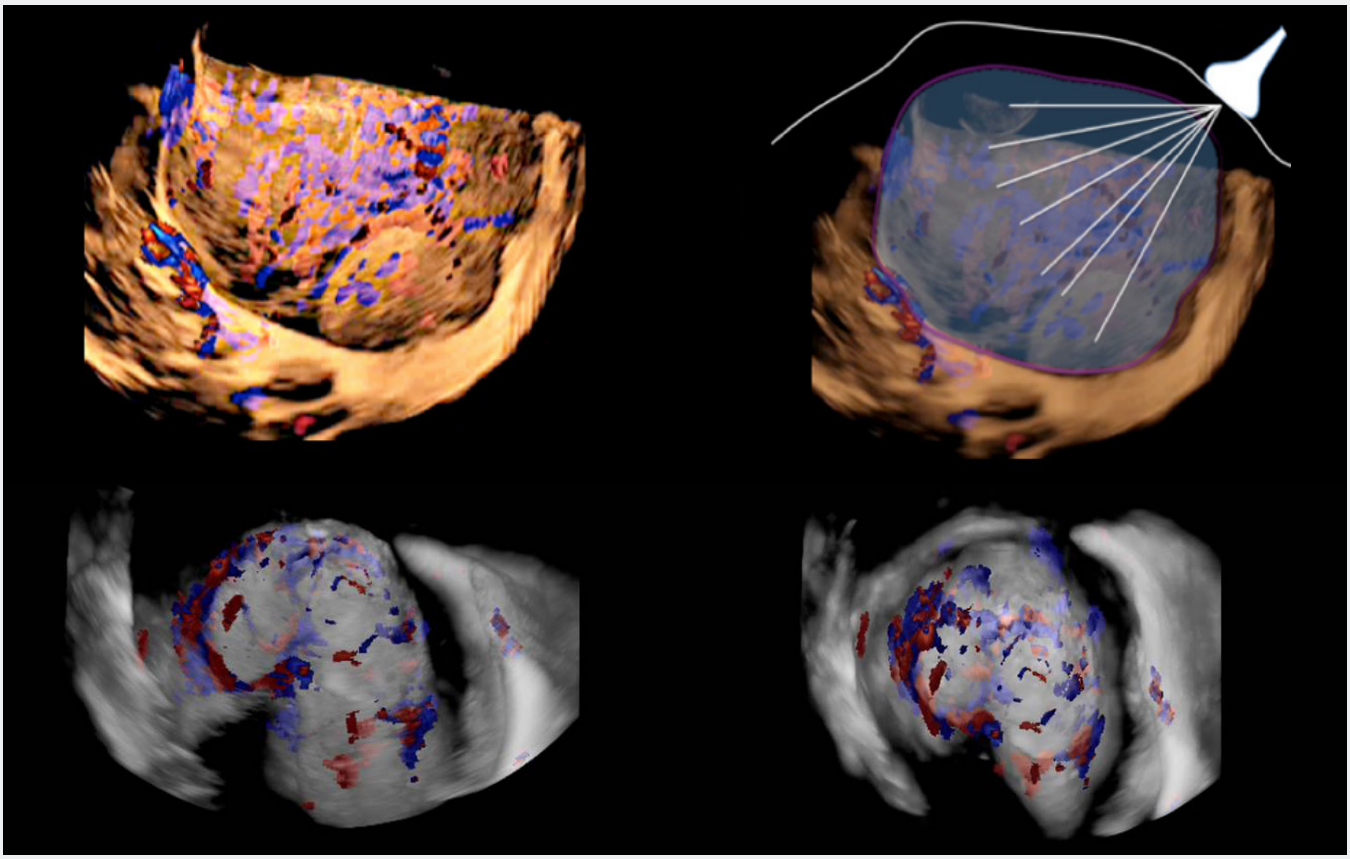

Figure 3. Vitual Cystoscopy : 3D sonographic virtual cystoscopy shows a widespread vascularization of the uterine serosa-bladder interface with an unhamed bladder mucosa(early percreta). The pictures show a remarkable vascularization of the surface of the bladderline

Conclusion

The knowledge of vascularity in placenta basal layer underlying the bladder wall, applying sonographic virtual cystoscopy is important to schedule the timing of delivery and the surgical management. In case of placenta percreta, we believe that virtual cystoscopy can complement the information provided by conventional cystoscopy which has some limitations, including invasiveness, patient discomfort, cost, and time.

Additionally, S-Flow™ and power Doppler of Samsung WS80A deliver the improved Doppler sensitivity and well-defined vascularity of such cases.

Supported Systems

(1) WS80A with Elite

References

(1) Miller DA, Chollet JA, Goodwin TM. Clinical risk factors for placenta previa-placenta accreta. Am J Obstet Gynecol 1997;177:210–4.

(2) Wu S, Kocherginsky M, Hibbard JU. Abnormal placentation: twenty-year analysis. Am J Obstet Gynecol 2005;192:1458–61.

(3) Higgins MF, Monteith C, Foley M, O'Herlihy C. Real increasing incidence of hysterectomy for placenta accreta following previous caesarean section. Eur J Obstet Gynecol Reprod Biol 2013;171(1):54–6.

(4) Warshak CR, Ramos GA, Eskander R, et al. Effect of predelivery diagnosis in 99 consecutive cases of placenta accreta. Obstet Gynecol 2010;115:65–9.

(5) Eller AG, Porter TF, Soisson P, Silver RM. Optimal management strategies for placenta accreta. BJOG 2009;116:648–54.

(6) Guy GP, Peisner DB, Timor-Tritsch IE. Ultrasonographic evaluation of uteroplacental blood flow patterns of abnormally located and adherent placentas. Am J Obstet Gynecol 1990; 163: 723–727.

(7) Lerner JP, Deane S, Timor-Tritsch IE. Characterization of placenta accreta using transvaginal sonography and color Doppler imaging. Ultrasound Obstet Gynecol 1995; 5:198–201.

(8) Comstock CH. The antenatal diagnosis of placental attachment disorders. Curr Opin Obstet Gynecol 2011; 23: 117–122.

(9) Chou MM, Ho ES, Lee YH. Prenatal diagnosis of placenta previa accreta by transabdominal color Doppler ultrasound. Ultrasound Obstet Gynecol 2000; 15: 28–35.

(10) Wong HS, Cheung YK, Williams E. Antenatal ultrasound assessment of placental/myometrial involvement in morbidly adherent placenta. Aust N Z J Obstet Gynaecol 2012; 52: 67–72.

(11) Shih JC, Palacios Jaraquemada JM, et al. Role of three-dimensional power Doppler in the antenatal diagnosis of placenta accreta: comparison with grayscale and color Doppler techniques. Ultrasound Obstet Gynecol 2009; 33: 193–203.

(12) Calì G, Giambanco L, Puccio G, Forlani F. Morbidly adherent placenta: evaluation of ultrasound diagnostic criteria and differentiation of placenta accreta from percreta. Ultrasound Obstet Gynecol 2013; 41: 406–412.

(13) Chalubinski KM, Pils S, Klein K, et al. Prenatal sonography can predict degree of placental invasion. Ultrasound Obstet Gynecol 2013; 42: 518–524

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