

# Crystal Vue Technology in the Study of the Uterine–bladder Interface in a Case of Abnormally Invasive Placenta

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## ABSTRACT

Crystal Vue is an advanced three-dimensional (3D) volume-rendering technology that allows to obtain highly detailed information about internal and external structures of fetus or uterus. The picture of the month shows the employment of such emerging technique in the study of the uterine–bladder interface, clearly pointing out its disruption in a case of abnormally invasive placenta (AIP) with bladder invasion.

**Keywords:** Abnormally invasive placenta, Crystal vue, Uterine–bladder interface, Virtual cystoscopy.

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## INTRODUCTION

The AIP is today a rising obstetric pathology, mirroring the increase of cesarean sections in the last decades. In consideration of the epidemiologic emergency and the great maternofetal morbidity and mortality, the prenatal diagnosis of accretism is extremely important.

Two-dimensional ultrasonography is the gold standard in the diagnosis of AIP. Nevertheless, tridimensional ultrasonography and 3D power Doppler allow to acquire multiplanar images on coronal, axial, and sagittal planes and with rotational technique permit to visualize the invasion of parametrium and the hypervascularization of the placenta–bladder interface more accurately.<sup>1,2</sup> A careful study of the degree of bladder invasion is an information with great impact on the subsequent management. The interruption of the uterine–bladder interface depends on

the hypervascularization of the space between myometrium and bladder. Blood vessels can get in touch with the bladder wall in case of percreta.

Recently, 3D high-definition “sonographic virtual cystoscopy” has been proposed in the diagnostic workup of patients with AIP, in order to analyze the vascular topography of the uterine–bladder interface.<sup>3</sup>

Very clear details of such district can be observed employing a new 3D volume-rendering technology called “Crystal Vue.” This is an emerging technique based on image-contrast enhancement that can be used for processing and rendering of acquired 3D volumes.

It is mainly used in skeletal and central nervous system imaging, adding anatomical information thanks to the great contrast enhancing power which conventional 3D does not have.<sup>4</sup>

We report the employment of Crystal Vue in the study of the bladder line hypervascularization, creating a highly detailed virtual cystoscopy. In Figure 1 we present and compare images of normal and abnormal uterine–bladder interface, examined using a Samsung WS80 Elite system (Samsung Medison Co. Ltd., Seoul, South Korea) with Crystal Vue software application.

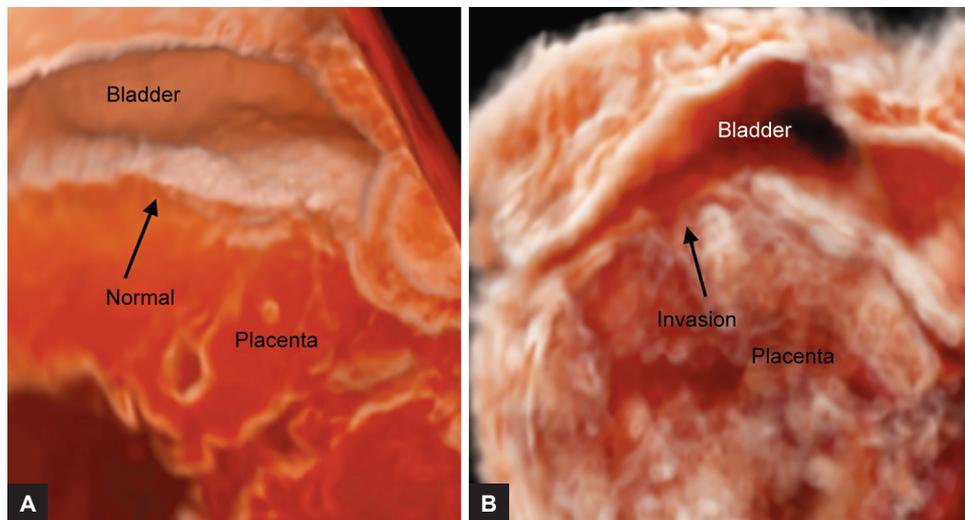
In both cases, the bladder filling is 300 mL, which we consider optimal for the evaluation of the uterine–bladder interface. Using Crystal Vue postprocessing on an acquired 3D volume, the second image clearly shows irregularity and disruption of the normal bladder wall architecture in a case of placenta percreta at 33 weeks of gestation in a patient with two previous cesarean sections. The uterine bulging toward the bladder is evident also.

To document the hypervascularization of the serosa–bladder interface, it helps to clarify preoperatively the degree of myometrial infiltration and involvement of the bladder wall. This knowledge is important for planning the timing of delivery and the surgical approach and for anticipating potential technical difficulties. With this purpose, Crystal Vue could integrate and confirm the evaluation made by two-dimensional and 3D power Doppler ultrasound, improving prenatal diagnosis of AIP.

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**Figs 1A and B:** Virtual cystoscopy realized with Crystal Vue. Normal (A) and abnormal (B) uterine–bladder interface. In picture B, Crystal Vue shows with great detail and efficacy the disruption of the uterine–bladder interface in a case of AIP with bladder invasion

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