



MRI versus Ultrasonography in detection of suspected placental invasion

Thesis

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Dedication

I dedicate this work to whom brought me to life My MUM life is always easy with your support and presence everything good happens because of you, My DAD you will always be the backbone of family & the Hero God bless you for us.

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List of Abbreviations

Abbr.	Full-term
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Introduction

Placental invasion is a life threatening condition whose incidence has been rising steadily over the past 50 years. Placental invasion includes placenta accreta, increta & percreta. Each depends on the degree of the myometrial invasion (*Anna et al., 2011*).

The pathophysiology of placental invasion is thought to be related to a deficiency of decidua (i.e., endometrium that has undergone pregnancy related changes). Abnormal placentation usually occurs at the lower anterior uterine segment probably due to deficiency of decidua after surgical interference mainly the increased incidence of caesarean section (*Anna et al., 2011*).

A defect in the normal decidua basalis from prior surgery or instrumentation is thought to allow abnormal adherence or penetration of the chorionic villi to or into the uterine wall resulting in placental invasion. The extent of adherence and invasion of the placental tissue varies: Superficial invasion of the basalis layer is termed placenta accreta (most common type); deeper invasion of the myometrium is termed placenta increta; and even deeper invasion involving the serosa or adjacent pelvic organs is termed placenta percreta. This abnormal adherence of the placenta to the uterus can result in catastrophic intrapartum hemorrhage at the time of placental delivery, often necessitating emergent hysterectomy (*Levine et al., 1997*).

Prior cesarean section and placenta previa are the two most important risk factors for placental invasion (*Silver et al., 2006*).

The clinical consequence of placental invasion is massive hemorrhage at the time of placental separation. Blood loss averages 3–5 L and can lead to disseminated intravascular coagulopathy, adult respiratory distress syndrome, renal failure, and even death. Hysterectomy is often required, leading to serious comorbidities such as cystectomy (15.4% of cases), ureteral injury (2.1%), and pulmonary embolus (2.1%), with 26.6% of patients admitted to the intensive care unit (*Silver et al., 2006*).

The prevalence of placenta accreta has increased more than 10-fold in the past 30 years, this increase appears to relate to the increasing rate of uterine surgery (curettage or cesarean delivery) (*Warshak et al., 2006*).

This mandates a good imaging modality to confirm or exclude the presence of abnormal placentation, Sonography remains the imaging modality of choice for evaluation of the placenta. US is the mainstay of placental imaging in the antepartum period (*Abramowitz et al., 2007*).

Color and power Doppler techniques permit direct visualization of placental vascularity, allowing assessment of

both the uteroplacental and fetoplacental circulations. Poor vascularity secondary to uterine scarring or large fibroids can lead to atrophy of the chorionic villi and corresponding compromise of fetal circulation. Both three-dimensional and four-dimensional (or real-time three-dimensional) US are emerging sonographic techniques that may ultimately be of value in placental volume measurements or vascular imaging (*Abramowitz et al., 2007*).

The use of MR imaging in the antepartum diagnosis of placenta accreta is relatively nascent. MR imaging is most useful in cases where the sonographic findings are equivocal or when the placenta has a posterior location (*Baughman et al., 2008*).

Many authors recommend a two-stage approach to optimize diagnostic yield, beginning with US in patients with clinical risk factors and then proceeding to MR imaging for equivocal cases. That being said, this diagnosis can be difficult to make even with the advanced tissue characterization available with MR imaging (*Baughman et al., 2008*).

Aim of the Work

The aim of this work is to elucidate the role of MRI & ultrasonography in detection of suspected placental invasion with emphasis on the MRI role in better tissue characterization.