

## Original Article

# Choosing the optimal therapeutic strategy for placental polyps using power Doppler color scoring: Transarterial embolization followed by hysteroscopic resection or expectant management?



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## ABSTRACT

**Objective:** To evaluate a protocol for selection of placental polyp management, including expectant management and hysteroscopic resection with or without transarterial embolization (TAE), using power Doppler color score (PDCS) as the vascularity parameter.

**Materials and Methods:** This retrospective case–control study included 25 patients who were diagnosed with placental polyps. We evaluated the vascularity of placental polyps with PDCS measured by transvaginal ultrasonography as follows: PDCS 1, no blood flow; PDCS 2, minimal flow; PDCS 3, moderate flow; and PDCS 4, marked blood flow. We then selected expectant management or hysteroscopic resection with or without TAE.

**Results:** Three of 17 patients with PDCS 1 or 2 underwent surgical intervention, and expectant management was successful in 14. Seven of eight patients with PDCS 3 or 4 underwent surgical intervention, while expectant management was successful in only one patient.

**Conclusion:** PDCS is a simple examination for evaluating the vascularity of placental polyps. PDCS might be useful for selecting the optimal treatment for placental polyps, such as expectant management or surgical intervention, according to their vascularity.

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## Introduction

A placental polyp is a polypoid mass that develops after parturition, induced abortion, and incomplete miscarriage [1,2]. It is a fragment of retained placental tissue in the uterine cavity that is synonymous with retained products of conception. The most significant of these is a hypervascular placental polypoid mass, which may be potentially life threatening, as it can cause severe vaginal hemorrhage that sometimes requires hysterectomy for complete hemostasis [3,4]. Transarterial embolization (TAE) with hysteroscopic resection is a minimally invasive procedure for the treatment of hypervascular placental polyps. However, this procedure is associated with surgical complications such as uterine perforation

and infection. Although no standard method to predict severe spontaneous vaginal hemorrhage due to hypervascular placental polyps has been established, dilation and curettage without TAE may be used because it is less invasive [1].

Transvaginal ultrasonography is a convenient and conventional method for gynecologists, which is widely used to evaluate the endometrial cavity. Transvaginal Doppler ultrasound has been reported to be useful for the diagnosis and assessment of placental polyps [5,6]. Hypervascular placental polypoid masses show prominent vascularity on Doppler ultrasound and computerized tomographic angiography [2,7]. Therefore, insufficiently assessed dilation and curettage can lead to life-threatening hemorrhage. TAE followed by hysteroscopic resection has recently been reported as a useful procedure [3,4,7]. In cases of hypovascular placental polyps that do not require therapeutic intervention, expectant management has been reported as a curative treatment [1].

In this study, we retrospectively reviewed 25 placental polyp cases and assessed the validity of surgical intervention with respect to vascularity evaluated with Doppler ultrasound.

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## Materials and Methods

Twenty-five patients with placental polyps treated at Nagoya University Hospital, Nagoya, Japan between January 2008 and February 2013 were included in this study. This study was approved by the Ethics Committee of Nagoya University Graduate School of Medicine. The diagnosis of placental polyps was based on the presence of a measurable focus of hyperechoic mass within the endometrial cavity on two-dimensional gray-scale transvaginal ultrasound. The diagnosis was confirmed by hysteroscopy and/or magnetic resonance imaging with or without blood flow on transvaginal ultrasound.

The International Ovarian Tumor Analysis group has suggested the use of subjective semiquantitative assessment of flow to describe the vascular features of ovarian masses [8,9]. A color score is used to describe the amount of blood flow for the whole tumor: color score 1, no detectable blood flow; score 2, minimal flow; score 3, moderate flow; and score 4, highly vascular [5,8,9]. We divided the 25 patients into four groups based on the power Doppler color score (PDCS; Figure 1). The transvaginal ultrasound settings were adjusted to allow maximal sensitivity to blood flow. Ultrasonic frequency was set at 8.0 MHz and power Doppler gain was reduced until the artifacts disappeared. This color score only refers to the color Doppler image, not the Doppler shift spectrum. A subjective qualitative assessment of flow within the placental polyp was performed.

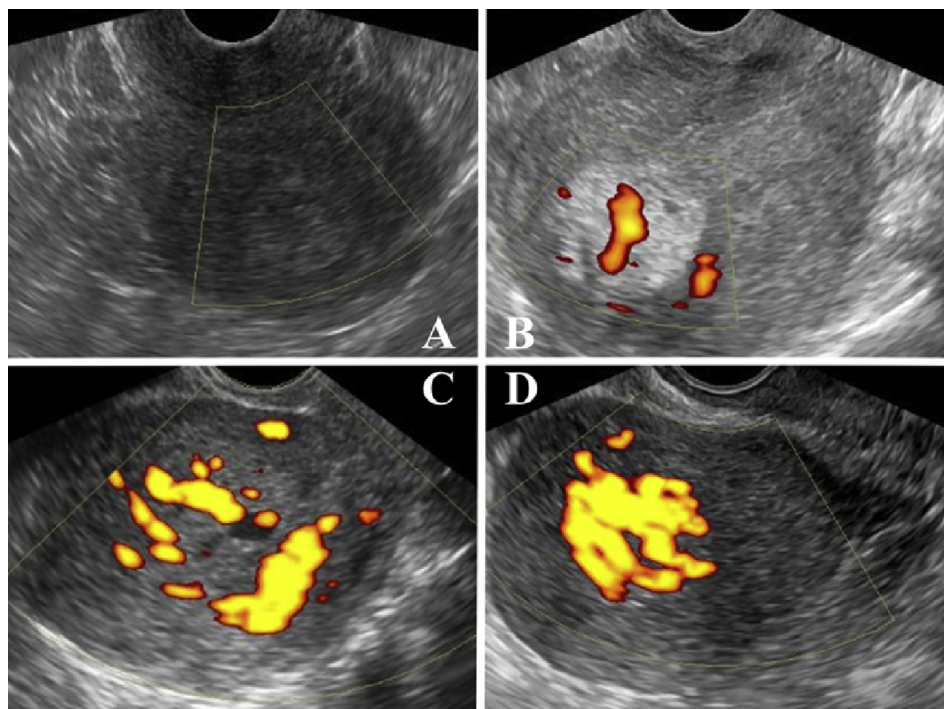
We also evaluated the patients' ages, serum  $\beta$ -human chorionic gonadotropin ( $\beta$ -hCG) levels, serum hemoglobin (Hb) concentrations, maximum diameter of placental polyps on initial medical examination, and treatment periods. Patients who received expectant management were included as controls and those who underwent hysteroscopic resection only or TAE followed by hysteroscopic resection were included as cases. Some patients underwent computed tomography (CT) and three-dimensional CT angiography for hypervascularity evaluation.

Data were analyzed using IBM SPSS Statistics version 20 (IBM, Endicott, NY, USA). We used the Student *t* test or the Mann–Whitney *U* test to compare the patients' characteristics, variables, serum  $\beta$ -hCG levels, serum Hb levels, maximum placental polyp diameter, and treatment periods between cases and controls. The Mann–Whitney *U* test was applied instead of the Student *t* test when the variables did not pass a normality test. A *p* value < 0.05 was considered statistically significant.

## Results

Twenty-five women with a median age of 32 years (range, 22–42 years) were recruited for this study. Table 1 presents the patients' clinical characteristics, including PDCS. The median (minimum–maximum) serum  $\beta$ -hCG levels, Hb levels, and treatment periods of the 25 patients were 20.0 mIU/mL (range, 1.2–4377.3 mIU/mL), 11.9 g/dL (range, 4.9–14.3 g/dL), and 45 days (range, 3–202 days), respectively. The mean maximum placental polyp diameter was 22 mm (range, 10–45 mm). Two women underwent hysteroscopic resection alone, eight women underwent TAE followed by hysteroscopic resection, and 15 women received expectant management. Of the 25 patients, 28% (7/25) had PDCS 1, 40% (10/25) had PDCS 2, 24% (6/25) had PDCS 3, and 8% (2/25) had PDCS 4. One of 17 women with PDCS 1 or 2 underwent hysteroscopic resection, two underwent TAE followed by hysteroscopic resection, and 14 received expectant management. The two patients with TAE followed by hysteroscopic resection had undergone dilation and curettage before transfer to our hospital. One of eight women with PDCS 3 or 4 underwent hysteroscopic resection, six underwent TAE followed by hysteroscopic resection, and one with PDCS 4 received expectant management. Chi-square test of independence showed that increasing PDCS was related to difficulty in successful expectant management ( $\chi^2 = 11.06$ ;  $p = 0.002$ ; Table 2).

Figure 2 shows the findings of a patient with PDCS 4 (Case 22 in Table 1) on transvaginal Doppler ultrasound at initial medical



**Figure 1.** Power Doppler color score (PDCS) as the vascularity parameter of placental polyps. (A) PDCS 1 (no detectable blood flow), (B) PDCS 2 (minimal flow), (C) PDCS 3 (moderate flow), and (D) PDCS 4 (highly vascular).

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