SHORT COMMUNICATION

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"Pocket sign" on hysterosalpingography: an adjunctive imaging finding suggestive of caesarean isthmocele

Emre Göksan Pabuccu

Department of Obstetrics and Gynaecology, Ufuk University Faculty of Medicine, Ankara, Turkey

ABSTRACT

Caesarean scar defects, known as isthmocele, are increasingly recognized in women with secondary infertility, yet hysterosalpingographic (HSG) criteria remain poorly defined. We describe a reproducible HSG feature, the "pocket sign," observed in seven women with prior caesarean delivery. This finding appears as contrast pooling in the anterior lower uterine segment near the internal cervical os. In all cases, it correlated with transvaginal ultrasound and hysteroscopic findings. Although non-specific and not diagnostic, the pocket sign may serve as an adjunctive indicator prompting further evaluation. Given anatomical variability and intrinsic limitations of HSG, multimodal imaging remains essential.

Keywords: Caesarean scar defect, isthmocele, hysterosalpingography, uterine niche, infertility, imaging

Introduction

Caesarean scar defects (CSD), also termed isthmocele or uterine niche, are increasingly recognised in women presenting with secondary infertility, postmenstrual spotting, and abnormal uterine bleeding.[1] Transvaginal ultrasound (TVUS), particularly when combined with saline infusion sonohysterography (SIS), is considered the first-line imaging modality due to its accessibility and diagnostic performance.[2] Hysteroscopy allows direct visualisation and is commonly used for confirmation.[3] Hysterosalpingography (HSG), although widely used in infertility work-up, is not a primary diagnostic tool for CSD, and standardised radiographic criteria are lacking. Nevertheless, suggestive radiographic patterns have been described, including variable shapes and locations of contrast pooling within CSDs, albeit without consistent terminology or validation.[4] In this report, we describe a reproducible HSG feature, termed the "pocket sign," and demonstrate its concordance with TVUS and hysteroscopic findings, suggesting a potential adjunctive role in clinical practice.

Methods

This technical report includes data from 7 patients at Centrum Clinic IVF Center, Ankara-Turkey. All had a history of caesarean delivery and underwent HSG during the early follicular phase as part of infertility evaluation. Images were independently reviewed by two experienced observers for the presence of a contrast pooling pattern defined as the "pocket sign."

HSG was performed using a balloon catheter and water-soluble contrast medium. Fluoroscopic images were obtained during injection and, when feasible, after catheter removal, when contrast retention was more clearly visualised. All patients subsequently underwent TVUS and diagnostic hysteroscopy. Findings were

Corresponding Author: Prof. Emre Göksan Pabuccu, MD, Department of Obstetrics and Gynaecology, Ufuk University Faculty of Medicine, Ankara, Turkey
E-mail: emregpabuccu@gmail.com **ORCID ID:** orcid.org/0000-0001-9015-5978
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compared across modalities to assess concordance. Patients with postmenstrual spotting underwent niche scar revision with a 5-mm mini-resectoscope or a 9-mm standard resectoscope, depending on niche size.

Results

All seven patients presented with secondary infertility; five reported postmenstrual spotting. On HSG, a consistent pattern of contrast pooling was observed in the anterior lower uterine segment, at or around the level of the internal cervical os and in some cases extending below it into the endocervical canal. This appeared as a shallow recess with bilateral or mildly asymmetric distribution, consistent with the "pocket sign" (Figure 1).

TVUS demonstrated a hypoechoic niche ≥2 mm at the caesarean scar site in all cases. Hysteroscopy confirmed a corresponding pouch-like defect in the anterior uterine wall in all patients. Schematic illustration (A) and correlation between imaging modalities, including vaginal sonography (B) and hysteroscopy (C), is shown in Figure 2.

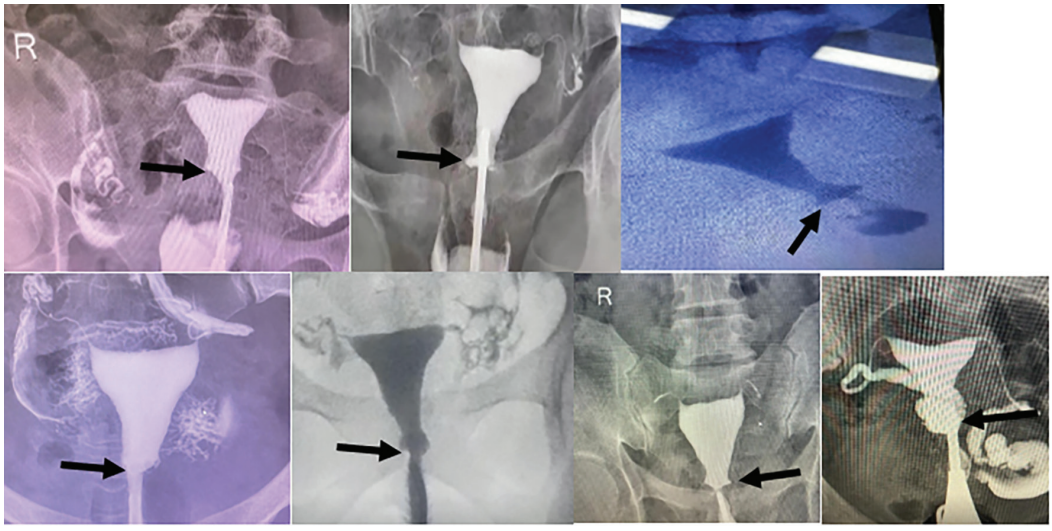

Figure 1. Representative hysterosalpingographic images from seven patients: demonstrating the "pocket sign" (black arrows), characterised by asymmetric contrast pooling in the anterior lower uterine segment at or near the level of the internal cervical os.

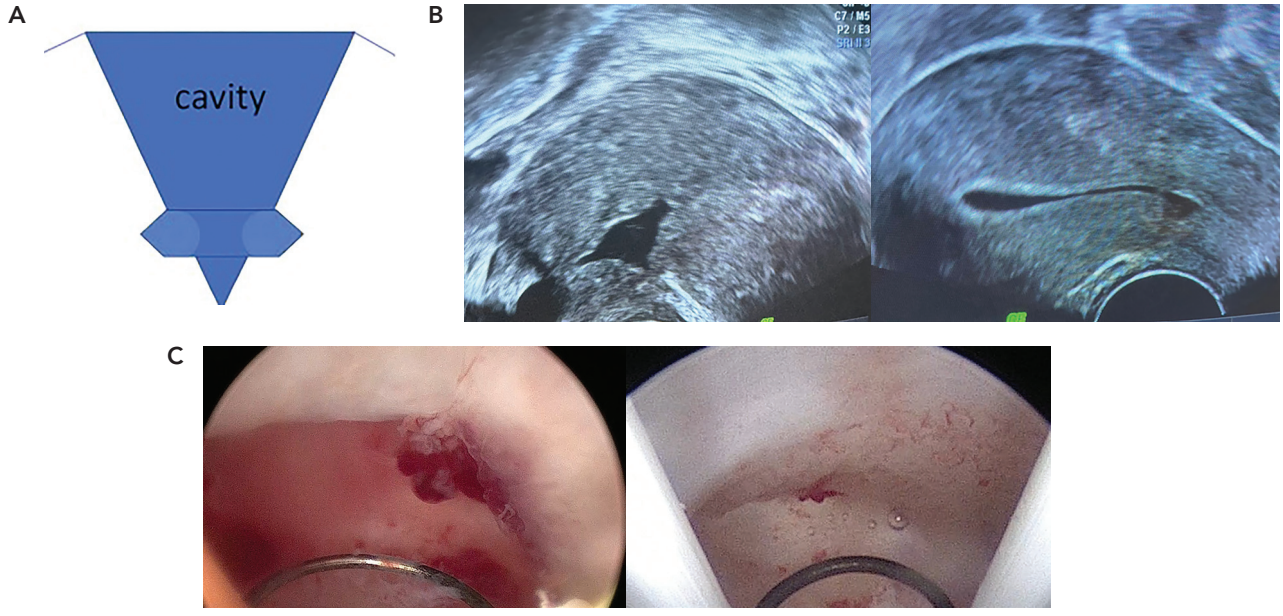

Figure 2. Multimodal correlation of the "pocket sign": A) Schematic illustration of contrast pooling on hysterosalpingography in the anterior lower uterine segment, at or near the level of the internal cervical os. B) Transvaginal ultrasound images showing a hypoechoic niche. C) Hysteroscopic views demonstrating a pouch-like caesarean scar defect.

Discussion

The "pocket sign" represents a pragmatic HSG feature that may raise suspicion of CSDs during infertility evaluation. Although similar contrast pooling patterns have been previously described,[4] our findings demonstrate consistent concordance with TVUS and hysteroscopy.

In current clinical practice, TVUS—particularly when combined with SIS—remains the first-line imaging modality due to its superior ability to delineate niche morphology.[2] SIS has been shown to improve both detection rates and morphological characterisation of CSDs and should be considered when initial imaging findings are inconclusive or suspicious. Within this context, HSG findings should be regarded as adjunctive observations that may prompt further targeted evaluation rather than as primary diagnostic criteria.

CSDs are anatomically heterogeneous and are not confined to the classical isthmic region. They may extend into the endocervical canal, and their variable location, size, and depth can influence their radiographic appearance on HSG. In addition, HSG is inherently limited by its two-dimensional projection and its inability to accurately assess myometrial thickness or defect volume.[5] Accordingly, the "pocket sign" should not be interpreted as a standalone diagnostic finding.

The clinical relevance of imaging-detected CSDs, particularly in asymptomatic individuals, remains uncertain. Imaging findings alone—especially those from HSG—should not dictate management decisions; instead, management should be individualised based on clinical presentation and reproductive goals.[6]

Finally, given the small sample size and the absence of diagnostic accuracy analysis, the clinical utility and reproducibility of the "pocket sign" require confirmation in larger, prospective studies.

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Data sharing: Possible when necessary.

Transparency: Lead author affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned (and, if relevant, registered) have been explained.

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