

Vaginal preparation with povidone iodine disinfection and saline douching as a safe and effective method in prevention of oocyte pickup-associated pelvic inflammation without spoiling the reproductive outcome: evidence from a large cohort study

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Summary

Purpose of investigation: The aim of this study was to investigate if vaginal preparation procedure affects the occurrence of oocyte pickup-associated pelvic inflammation (OPU-PI) and the reproductive outcome in an in vitro fertilization (IVF) program. **Materials and Methods:** The occurrence of OPU-PI and the reproductive outcome were compared between 956 infertile patients undergoing vaginal preparation with saline douching alone versus 1,216 infertile patients undergoing a combination of povidone iodine disinfection and subsequent saline douching in an IVF program. **Results:** OPU-PI occurred in four patients (0.042%) in the saline douching alone group, whereas there were no cases in the combination group ($p = 0.016$). There were no significant differences in the rate of fertilization, morphologically good embryo acquisition, clinical and ongoing pregnancy between the two groups ($p > 0.23$). **Conclusions:** This large cohort study demonstrated that a combination of vaginal povidone iodine disinfection and subsequent saline douching is more effective procedure than saline douching alone to prevent OPU-PI, without spoiling the oocyte quality.

Key words: Oocyte pickup-associated pelvic inflammation; Povidone iodine; Saline douching; Vaginal preparation.

Introduction

Pelvic inflammation is a rare but serious complication that arises following oocyte pickup in an in vitro fertilization (IVF) program [1]. Pelvic inflammation is reported to occur in approximately 0.5% of the infertile patients undergoing oocyte pickup, even with prophylactic antibiotics administration [2]. The major cause of oocyte pickup-associated pelvic inflammation (OPU-PI) is considered to be iatrogenic dissemination of vaginal microorganisms into abdominal cavity in the process of follicular needle aspiration [3].

Early studies demonstrated saline douching immediately before OPU as a safe and effective vaginal preparation procedure to wash out the vaginal bacterial flora without compromising the reproductive outcome [4]. However, accumulating studies report that vaginal saline douching is insufficient to prevent moderate-to-severe OPU-PI including peritonitis and ovarian abscess [5-7]. The aim of this study was to compare the preventive effects on OPU-PI and the reproductive outcome between the vaginal preparation procedure with saline douching alone versus that with a combination of vaginal povidone iodine disinfection and saline douching.

Materials and Methods

From April 2007 to March 2009, 956 infertile patients underwent OPU in the present IVF center. The vulva was rinsed with

sterilized saline solution and the vagina was douched similarly (approximately 100 ml) immediately before OPU. From April 2009 to March 2011, vaginal preparation procedure was switched to a combination of povidone iodine disinfection and following saline douching for 1,216 infertile patients undergoing OPU [8]. The vulva was rinsed with sterilized saline solution and the vagina was disinfected with aqueous povidone iodine (approximately 50 ml) and then douched with saline solution (approximately 100 ml) immediately before OPU. All patients underwent prophylactic antibiotics intravenous administration of fosfomycin (one g, drip infusion, starting before OPU), along with postoperative two-day oral administration of clarithromycin (400 mg/day) or cefcapene pivoxil hydrochloride (300 mg/day). IVF was performed as described previously [9].

The incidence of OPU-PI as well as the parameters for reproductive outcomes was statistically compared between the two groups using Fisher exact test. The parameters for clinical demographics were statistically compared using Student's *t* test.

Results

In the vaginal saline douching group, four out of 956 patients (0.42%) were diagnosed with OPU-PI due to fever, abdominal pain, leukocytosis, and elevated serum C-reactive protein (Table 1). The onset of OPU-PI ranged from the day 1 to day 40 following OPU. All these patients with OPU-PI had had a past history and/or present illness of endometriosis. In three patients with ovarian endometrioma, OPU-PI occurred despite that the authors carefully avoided puncture and aspiration of the cysts. Antibiotics therapy alone was effective in two patients, whereas the other two patients required surgical treatments for ovarian en-

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Table 1. — Characterization of the patients with OPU-PI in the vaginal saline douching group.

ID	Age	Infertility Category	Presence of endometriosis	Date of hospitalization and discharge from OPU	Treatment
1	33	Secondary	Yes Unilateral ovarian endometrioma (21-mm-diameter in the right ovary)	Day 1/day 9	Aspiration and drainage of abscess/antibiotics ^a
2	38	Secondary	Yes Past history of laparoscopic ablation of pelvic endometriosis lesions	Day 7/day 17	Aspiration and drainage of abscess/antibiotics ^b
3	31	Primary	Yes Bilateral ovarian endometrioma (32-mm-diameter in the right ovary and 42-mm-diameter in the left ovary)	Day 1/day 40	Laparoscopic cystectomy/antibiotics ^c
4	33	Primary	Yes Unilateral ovarian endometrioma (32-mm-diameter in the left ovary)	Day 40/day 43	Antibiotics ^d / laparotomy (in a tertiary care unit)

^a: cefotaxime 2 g/day and gentamycin 80 mg/day, four days, intravenously; ^b: cefotaxime 2 g/day and gentamycin 80 mg/day, four days, intravenously, and imipenem/cilastatin 2 g/day and levofloxacin 80 mg/day, additional four days, intravenously; ^c: cefotaxime 4 g/day, four days IV); ^d: cefotaxime 3 g/day, three days IV).

dometrioma. Two out of four patients had a successful pregnancy within six months of OPU and live birth.

In the vaginal povidone iodine disinfection/saline douching group, there were no patients who developed OPU-PI. Vaginal preparation with povidone iodine disinfection and saline douching was significantly effective in prevention of OPU-PI over that with saline douching alone ($p = 0.016$). Meanwhile, there were no significant differences in the age, body mass index, gravidity, parity, fertilization rate, morphologically good embryo acquisition rate, clinical pregnancy rate, and ongoing pregnancy rate between the two groups ($p > 0.23$).

Discussion

One of the critical risk factors for OPU-PI is the presence of endometriosis, particularly when the ovarian endometrioma is unintentionally punctured and the content fluid leaked into abdominal cavity [3-5]. In consistent with these reports, the present authors confirmed the close link between endometriosis and OPU-PI, as all patients had its past history and/or present illness. The onset of OPU-PI ranged from the day 1 to day 40 following OPU.

This large cohort study demonstrated that vaginal povidone iodine disinfection immediately before OPU is an effective tool regarding prevention of PI. There has been a concern that povidone iodine acts as a toxic agent for oocytes when it was used as vaginal disinfectant [4]. The present findings, however, support the previous report showing that vaginal preparation with a combination of povidone iodine disinfection and subsequent saline douching did not reduce the fertilization and implantation rate in the IVF cycle [6]. These findings suggest that the good rinse with saline may be important to block the intraperitoneal dissemination of povidone iodine and maintain the integrity of the oocytes aspirated.

Following adoption of vaginal povidone iodine disinfection and saline douching from April 2009 onwards, the authors have not seen the cases with OPU-PI. This procedure

is simple, but cheap and effective enough to prevent OPU-PI without spoiling the oocyte quality.

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