The Effects of Preoperative Vaginal Misoprostol on Gastric Contents

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**Background:** The aim of this study was to evaluate the effect of vaginal misoprostol for operative hysteroscopy on preoperative gastric contents and the risk of acid aspiration pneumonitis.

**Methods:** Sixty-five patients undergoing operative hysteroscopy who received prophylactic vaginal misoprostol 200μg were assigned to the misoprostol group, and sixty-five gynecologic patients without premedication were assigned to the control group. After preoxygenation, a 14-F multiorifice nasogastric tube was inserted for direct aspiration under target-controlled propofol sedation.

**Results:** The mean pH value of gastric fluid was significantly higher in the misoprostol group (2.7 ± 1.0) than the control group (1.9 ± 0.7). The mean aspirated volume was (ml) 15.3 ± 7.4 in the misoprostol group and 16.8 ± 6.9 in the control group (P > 0.05). There were significantly less patients at high-risk (gastric fluid volumes > 25 ml and pH < 2.5) in the misoprostol group (8/65, 12.3%) than in the control group (18/65, 27.7%). Prophylactic vaginal misoprostol increases the preoperative gastric pH and reduces the number of at high-risk of acid aspiration pneumonitis.

**Conclusions:** Therefore, vaginal misoprostol for outpatient hysteroscopy may have preventive effect on the acid aspiration pneumonitis. (Korean J Anesthesiol 2006; 50: S 28－30)

**Key Words:** aspiration pneumonitis, gastric content, outpatient surgery, prostaglandins E.

**INTRODUCTION**

Misoprostol (Cytotec®, Searle, USA), an E₁ prostaglandin analog, is commonly used in obstetrics for induction of abortion and labor as well as for control of postpartum vaginal bleeding.¹ Recently, vaginal misoprostol applied before operative hysteroscopy has reduced the need for cervical dilatation, facilitated hysteroscopic surgery, and minimized cervical complications.² Misoprostol is also widely known as a safe and effective treatment for peptic ulcer diseases. This drug has proven to be a potent inhibitor of gastric secretion in both animals and humans.³,⁵ However, the preoperative gastric effect of vaginal misoprostol for day-case hysteroscopic surgery has not been evaluated yet.

The aim of this study was to evaluate the effect of vaginal misoprostol for operative hysteroscopy on preoperative gastric contents and the risk of acid aspiration pneumonitis in gynecologic patients compared with patients undergoing diagnostic laparoscopy without premedication.

**MATERIALS AND METHODS**

The study was approved by the hospital Ethics Committee and written informed consent was obtained from each gynecologic patient. Patients with a history of any gastrointestinal disorder or those who were receiving any medication which would interfere with gastrointestinal function were excluded from the study. Sixty-five patients undergoing operative hysteroscopy for small polyp who received 200μg misoprostol into the posterior fornix 8 h prior to surgery were assigned to the misoprostol group and sixty-five infertile patients scheduled for diagnostic laparoscopy without premedication were assigned to the control group. All patients fasted after midnight.

After preoxygenation with 100% oxygen mask for 5 minutes, total intravenous sedation was induced and maintained using 0.5 mg/kg midazolam and 4μg/ml of target concentration of...
propofol using an infusion pump (Becton-Dickinson infusion system, Le Grande Chemin, France). Before the start of surgery, a 14-F multi-orifice nasogastric tube (Levin tube, Yushin Medical, Korea) was inserted for direct aspiration of gastric contents. During the aspiration, 100% oxygen was administered intermittently with positive assisted pressure, when necessary. Anesthesia was maintained by increasing target concentrations of propofol and adding incremental doses of alfentanil for appropriate surgical conditions after the removal of nasogastric tube.

The volume of gastric fluid and pH were measured using a metered cylinder and a double-checked pH meter (model-920A, Orion Research, Inc., Massachusetts, USA). The blood concentration of glucose was measured at the same time using a blood glucose meter (SureStep5, Lifescan inc. USA) because of the importance of glucose in the regulation of gastrointestinal function.6,7

A power analysis was performed to determine the sufficient sample sizes required for establishing a significant difference in the gastric variables and in the percentage of patients at risk for aspiration pneumonitis based on the results of the preliminary study, using an c-value of 0.05, and power of 0.8. The calculated sample size was 65 for each group.

Statistical analysis was performed using Mann-Whitney rank sum test and t-test for parametric values, and Chi-square analysis was used to compare the proportion of patients in the two groups. P < 0.05 was considered statistically significant.

RESULTS

There were no statistical differences in the patient’s demographics, oral fasting time, and blood glucose concentration between the two groups (Table 1).

The pH value of gastric fluid was 2.7 ± 1.0 (range 1.2-7.0) in the misoprostol group and 1.9 ± 0.7 (range 1.2-5.9) in the control group (P < 0.05). The aspirated volume (ml) was 15.3 ± 7.4 (range: 5.0-44.0) in the misoprostol group and 16.8 ± 6.9 (range: 0-40.0) in the control group (P > 0.05). There were significantly less patients at high-risk (gastric fluid volumes > 25 ml and pH < 2.5) in the misoprostol group (8/65, 12.3%) than in the control group (18/65, 27.7%).

All aspirations were uneventful, and no patient had laryngospasm, epistaxis, or vomiting during the procedure.

DISCUSSION

We confirmed gastric antisecretory effect of misoprostol, which increased preoperative gastric pH and reduced the risk of acid aspiration pneumonitis in this study. In the previous studies, misoprostol was effective against all known physiological modalities stimulated secretion. These were stress, ethanol, hyper- and hypotonic solutions, non-steroidal anti-inflammatory drugs and meal-stimulated gastric secretion.8,9 The mechanism of the gastric antisecretory effects of misoprostol were neither a consequence of the reduction of serum gastrin9 nor a consequence of altered gastric barrier functions,10 but rather due to direct effect on the parietal cells.11 In this study, even vaginally administered misoprostol increased preoperative gastric pH and decreased the risk of acid aspiration. It may be due to the systemic effects of misoprostol. This drug is rapidly absorbed and undergoes immediate esterification to its free acid, which appears in the plasma and is responsible for the drug’s clinical activity. Zieman et al.12 reported that the systemic bioavailability of misoprostol is three times greater when it is administered vaginally than orally and suggests that vaginal administration could be dosed at longer intervals than oral. Their comparative analysis of the serum levels of the principal metabolite of misoprostol revealed that bioavailability was best following vaginal administration (time to peak concentration, T_max = 80 ± 27 min) followed by a plateau phase lasting several hours.

Side effects of misoprostol are mainly gastrointestinal and consist of diarrhea (13-40%), with a minor incidence of nausea, flatulence, dyspepsia, vomiting, and constipation.13 In the present study, the side effects in the misoprostol group were tolerable without treatment before surgery.

Table 1. Demographic and Clinical Data of Patients

<table>
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<th>Misoprostol group (n = 65)</th>
<th>Control group (n = 65)</th>
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<tbody>
<tr>
<td>Age (yr)</td>
<td>34.0 ± 2.5</td>
<td>33.8 ± 1.8</td>
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<tr>
<td>Weight (kg)</td>
<td>58.6 ± 5.1</td>
<td>56.7 ± 7.2</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>159.6 ± 4.8</td>
<td>162.3 ± 6.4</td>
</tr>
<tr>
<td>Fasting time (h)</td>
<td>13.1 ± 1.0</td>
<td>12.5 ± 2.0</td>
</tr>
<tr>
<td>Glucose conc. (mg/dl)</td>
<td>94.7 ± 6.5</td>
<td>99.3 ± 5.7</td>
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<tr>
<td>Duration of proc. (min)</td>
<td>15.8 ± 6.9</td>
<td>14.3 ± 5.1</td>
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</table>

proc.: procedure. Data are mean ± SD. There are no significant differences between the two groups.
Our study has two limitations. First, the technique of gastric aspiration cannot guarantee complete gastric emptying and volumes recorded reflect only the maximum gastric aspirate obtained at the time. Dye absorption technique and fiberoptic gastroscopy are more reliable than blind aspiration but they are more complicated, time consuming, and clinically limited. Second, the diagnosis and surgery of the two groups were not same, therefore, further controlled designed studies are needed.

In conclusion, vaginal misoprostol 8 h before operative hysteroscopy increases the preoperative gastric pH and reduces the number of patients at high-risk of acid aspiration pneumonitis. Therefore, routine prophylaxis for acid aspiration has to be reconsidered in the fasting patients given misoprostol prior to elective day-case hysteroscopy.

REFERENCES