

A New Enema for Treatment of Intussusception with Hydrostatic Reduction: Olive Oil

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Abstract

Objectives: Intussusception is routinely treated using ultrasound-guided hydrostatic reduction (USGHR) with normal saline in our paediatric surgery department. With this study, olive oil was added to normal saline in ultrasound-guided reduction of intussusception. **Materials and Methods:** Forty patients who were diagnosed and treated for intussusception in Van Yuzuncu Yil University Faculty of Medicine Pediatric Surgery Department from March 2017 to May 2017 were included in the study. During this retrospective study, randomly chosen 20 patients that treated with USGHR using normal saline were marked as Group 1. Moreover, 20 patients that treated with USGHR using a mixture of olive oil and saline (10% olive oil 90% normal saline) were marked as Group 2. Patients' age, gender, symptoms, treatment techniques, complications and hospitalisation periods were retrospectively noted. **Results:** Forty patients were included in the study. In Group 1, 14 patients were treated in the first session, 4 patients were treated in the second session and 2 patients required laparotomy. Mean reduction time in this group was 15 min mean fluid volume used in each reduction was 80 ml/kg and mean hospitalisation period was 38 h. In Group 2, 19 patients were treated in the first session, and only 1 patient required a second session. Mean reduction time was 12 min, used fluid volume was 58 ml/kg for each reduction and hospitalisation period was 24 h. **Conclusion:** The average volume of fluid used for reduction, average reduction time, numbers of recurrent reductions and hospitalisation were less when a mixture of olive oil and normal saline were used in comparison with when normal saline was used alone to reduction the intussusception under ultrasound guidance. Using olive oil mixed with normal saline as a new enema fluid is likely to increase the success rate of ultrasound-guided reduction of intussusception.

Keywords: Hydrostatic reduction, intussusception, normal saline, olive oil

INTRODUCTION

Telescopic insertion or invagination of proximal bowel segment into distal bowel segment is defined as intussusception and may be treated with both surgical and non-surgical methods.^[1,2] Although surgical methods provide the certain cure, it is associated with higher morbidity and mortality rates.^[2] For this reason, first-line treatment of intussusception is non-surgical techniques such as ultrasound-guided hydrostatic reduction (USGHR) or fluoroscopy-guided air enema reduction.^[2,3] In the treatment of intussusception, there are other methods using air and liquid enemas, oral medications, topical medications, bloodletting, ingestion of heavy metals, electric shocks, bougienage and manual manipulation per rectum, which have little to none efficacy over one another.^[4,5]

An ideal enema should be natural, harmless to the body when ingested and should be able to provide a reduction of intussusception under low pressure because of the risk of perforation. Olive oil is a natural and harmless substance which has antioxidant and immune system boosting properties.^[6-8] According to our hypothesis, mixing olive oil with normal saline may be beneficial in the ultrasound-guided reduction of intussusception under low pressures.

This study aimed at assessing, the efficacy and success rate of olive oil-saline mixture in the hydrostatic reduction of intussusception under ultrasound guidance.

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MATERIALS AND METHODS

Forty patients who were diagnosed and treated nonoperatively for intussusception in Van Yuzuncu Yil University Faculty of Medicine Pediatric Surgery Department from March 2017 to May 2017 were recruited into the study. All patients were diagnosed with ultrasound.

In this retrospective study, randomly chosen 20 patients that treated with USGHR using normal saline were marked as Group 1 and 20 patients that treated with USGHR using a mixture of olive oil and saline (10% olive oil and 90% normal saline) were marked as Group 2. Patients' age, gender, symptoms, treatment techniques, complications and hospitalisation periods were retrospectively noted. All patients received intravenous 0.9% normal Saline 20 mg/kg/h, and midazolam was given as a premedication. Due to perforation risks, antibiotic prophylaxis was given in a single dosage of 50 mg/kg cefazolin and 30 mg/kg metronidazole. With the patient lying in the right lateral position a 14–18 Fr Foley's catheter was introduced into the anal canal, and the balloon was inflated with 15–25 ml of saline. Foley's catheter size was chosen according to patient body size. Then, the balloon of the catheter was placed in anal seal to avoid leaking back of the fluid. The on-call radiologist used high-resolution ultrasound IU22 (Philips, Netherlands) to image the intussusception. A clinician from paediatric surgery department remained in attendance in the suite.

The results were statistically assessed using SPSS Inc., Chicago, IL, USA (version 15). Normality controls were done using Shapiro–Wilk test. Groups were compared in terms of fluid volume used in reduction, reduction time and hospitalisation periods using independent sample *t*-test. The statistical significance level was set at $P < 0.05$. Ethical acceptance was taken from the Local Ethic Committee of our university.

RESULTS

Forty patients with intussusception (21 M/19 F) with a mean age of 20 (6–36) months and with complaints of pain, emesis, crying attacks, bloody stool or abdominal distension were included in the study. The duration of symptoms ranged from 4 to 48 h.

The patients in Group 1 received approximately 80 ml/kg of fluids for each attempt through the anus and the mean procedure time was 15 min. Fourteen patients were treated in the first session, 4 were treated in the second session and two patients required surgery after 3 attempts with persistent target-sign as seen on ultrasonography and those patients were suspected to have lead points. A total of 28 reductions were performed in Group 1. In one patient, adhesive-bowel obstruction developed because of laparotomy and was treated with conservative methods. Three patients were diagnosed with mild hypernatremia following a reduction with normal saline. The mean duration of hospital stay in this group was 38 h.

The patients in Group 2 received a mean fluid volume of 58 ml/kg through anal canal and the mean procedure time

Table 1: Distribution of data according to treatment methods

Parameters	USGHR with saline	USGHR with saline and olive oil	P
Reduction time (min)	15.07±0.70	12.19±0.41	0.02
Fluid volume (ml/kg)	80.11±2.03	54.23±3.14	<0.001
Hospitalisation periods (h)	38.68±4.01	24.01±2.96	<0.001

USGHR: Ultrasound-guided hydrostatic reduction

was 12 min. Nineteen patients were treated in the first session whereas only one patient required a second session. None of the patients required additional surgical interventions and no hypernatremia were detected. The mean duration of hospital stay was 24 h.

There was no significant difference between the genders in terms of treatment methods ($P > 0.05$). Olive oil was found to significantly reduce the fluid volume used for reduction in intussusception treatment, reduction time, number of recurrent reductions and hospitalisation periods ($P < 0.05$) [Table 1].

DISCUSSION

Intussusception is reported to have an incidence rate between 0.15% and 0.43% and is the most common reason for bowel obstruction in infants. It is the second-most common abdominal emergency in paediatric surgery after appendicitis.^[1,9] Ultrasound has almost 100% sensitivity and specificity in the diagnosis of intussusception.^[10,11] Since surgical methods carry a lot of disadvantages, non-surgical treatments are among the first options in the management of intussusception.^[11,12] It was seen that various materials are used in non-surgical management.^[1,5,9-15] Previous studies reported the used volume of materials, their periods and most importantly, the associated complications with the materials^[1,5,9-15] Nayak's^[7] study reported that using fluoroscopy-guided hydrostatic reduction with barium enemas caused unnecessary radioactive exposure to the patient, missed residual invaginations and caused the leading point to disappear. Compared to water-soluble contrast materials, barium enemas can cause severe peritoneal reactions and can have an adhesive effect on the tissues.^[15] Shiels^[13] experimental study on pig models reported perforation in hydrostatic reduction from 120 mmHg pressure. After reviewing the disadvantages of other enemas as reported by previous studies, we think that new enema materials which provide easiness, complication prevention and increased success rates in the treatment of invagination.

Although globally saline is the most commonly used solution used in hydrostatic reduction due to its safety, low cost and availability, success rate is reported to be around 77%.^[4,5] We also used saline USGHR for routine treatment of intussusception in our paediatric surgery department for a long time. However, difficulties in technique application and success rates in younger patients aged 3–8 months are frequent. Considering the clinical and experimental studies

done on olive oil,^[6-8,16] we would like to suggest using olive oil in the non-operative reduction of intussusception. Olive oil is a natural, balanced and non-irritant liquid with antioxidant properties.^[6-8] It has a positive effect on bowel motility due to its lubricant and laxative properties.^[6] It was found to significantly reduce the fluid volume in each reduction, duration of the procedure, number of recurrent reductions and duration of hospital stay in our study. Another important contribution of olive oil to the treatment is the reduction of rate of complications. As the volume of normal saline used for reduction was lower in olive oil treatment group, none of the patients developed hypernatremia. In addition, according to some studies leaking of olive oil into intraperitoneal area can be a protective factor against complications such as adhesion.^[8]

CONCLUSION

Olive oil allows a reduction in lower pressures due to its low molecular weight and oil-lubricant properties. This causes a significant reduction in rate of perforation and unnecessary morbidity. Its effect on motility can cause a reduction in peristalsis-related recurrent invagination. Even in the event of perforation, leaking of olive oil into the intraperitoneal cavity may have an adhesion-preventing effect. Our study shows a clear increase in treatment success rates after using olive oil as an enema in intussusception treatment.

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Conflicts of interest

There are no conflicts of interest.

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