

Current diagnosis and image-guided reduction for intussusception in children: teamwork approach

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Key message

- The successful and safe enema reduction of intussusception depends primarily on the experience and preference of the radiologists and the availability of resources.
- The establishment of a standardized manual or protocol for reduction and pre-reduction treatment of intussusception, along with the collaboration of pediatricians, radiologists, and surgeons, is expected to improve the treatment success rate.

Pediatricians or emergency physicians should suspect first in young children with cyclic irritability, vomiting, or bloody diarrhea.¹⁾ If abdominal tenderness or palpable mass is present on the child's abdominal examination, it is more likely to be intussusception.

Abdominal ultrasonography (USG) is the primary diagnostic tool for the diagnosis of intussusception.²⁾ Although point-of-care USG by trained pediatric emergency physicians had high sensitivity (100%) and specificity (95.6%),³⁾ abdominal USG is usually performed by a radiologist rather than a pediatrician or emergency physician because most pediatric intussusception is managed in training hospitals in Korea.⁴⁾ The advantage of performing USG by radiologists is that other findings can determine the failure of enema reduction,⁵⁾ including the blood supply status of the intussusception, presence of intestinal necrosis or ascites, and the pathologic leading causes can also be confirmed.

Image-guided enema reduction is the initial treatment modality for intussusception and is performed by a radiologist. The successful and safe enema reduction of intussusception depends primarily on the experience and preference of the radiologists and the availability of resources.⁶⁾ In Korea, the second-grade residents (42%) in the radiology department most commonly performed the enema reduction in training hospitals.⁴⁾ In one university hospital, among 657 cases, 596 children were successfully treated, and 12 patients (1.83%) had colon perforation from 1990 to 2001.⁷⁾ The success rate of enema reduction was high and the severe complication of enema reduction was slightly high to the meta-analysis report (0.39%–0.43%).⁸⁾ For safe and successful enema reduction of intussusception, the training of the

radiology department residents is essential.

The pediatrician receives a consent form for enema reduction from the parents after diagnosis of intussusception. Enema reduction should be performed with parental understanding and consent of the procedure and complications of enema reduction. It is imperative to explain how to perform enema reduction, its complications, and the possibility of failure. In addition, when enema reduction fails, or complications develop, it is necessary to explain and obtain consent for emergency surgery. Therefore, enema reduction can be performed in hospitals where surgery is possible. In cases of failure of enema reduction, intestinal perforation, and multiple recurrences, only a surgeon can treat it,⁵⁾ so it is necessary to prepare for surgery by communicating it in advance.

In Korea, the success rate of enema reduction for intussusception is about 82.0% to 90.0%.^{9,10)} The recurrence of the intussusception rate was 15.0% (4,580 of 30,444 cases).⁹⁾ Most recurrent intussusception is also managed by enema reduction. But multiple recurrent cases are managed by surgery.

Pediatricians always consider the complications of enema reduction before and after the procedure. The most severe complication is the bowel's perforation, requiring urgent surgery. In the review of 12 colonic perforations during pneumatic enema reduction,⁷⁾ the perforation site was most commonly found at the proximal part of intussusception and had a single perforation. Pathologic reports showed hemorrhagic necrosis and mesenteric laceration at the site of colon perforation. Colonic perforation during pneumatic air enema had 58.3% of tension pneumoperitoneum, requiring immediate decompression.⁷⁾ Therefore, the pediatrician should form the surgeon that enema reduction will be performed.

Intussusception is not a disease that a pediatrician can treat alone. The establishment of a standardized manual or protocol for reduction and pre-reduction treatment along with collaboration with related departments is expected to contribute to the reduction of complications and improvement of the treatment success rate.¹¹⁾ The pediatrician must do all things to suspect the possibility of intussusception, contact the radiologist for abdo-

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Table 1. Role of doctors who treated children with intussusception

Doctor	Role
Pediatrician	History taking
	Physical examination
	Initial diagnostic order
	Consent for the enema reduction
	Preparation of enema reduction
Radiologist	Reading simple abdomen
	Abdominal ultrasonography
	Image-guided enema reduction
Surgeon	Ready for surgical management
	Surgery
	Manual reduction
	Hemicolectomy, etc.

minimal USG, explain and consent to the parents for enema reduction, and informs the surgeon about the possibility of surgery while going for enema reduction (Table 1). In conclusion, pediatricians, radiologists, and surgeons should cooperate closely.

See the article "Current diagnosis and image-guided reduction for intussusception in children" via <https://doi.org/10.3345/cep.2021.01816>.

Footnotes

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References

1. JO S, Lim IS, Chae SA, Yun SW, Lee NM, Kim SY, et al. Characteristics of intussusception among children in Korea: a nationwide epidemiological study. *BMC Pediatrics* 2019;19:211.
2. Hryhorczuk AL, Strouse PJ. Validation of US as a first-line diagnostic test for assessment of pediatric ileocolic intussusception. *Pediatr Radiol* 2009;39:1075-9.
3. Lee JY, Kim JH, Choi SJ, Lee JS, Ryu JM. Point-of-care ultrasound may be useful for detecting pediatric intussusception at an early stage. *BMC Pediatrics* 2020;20:155
4. Yoon JH, Kim HJ, Koo HW. Recent trends of radiological reduction of intussusception in children: a nationwide phone survey to training hospitals in Korea. *J Korean Radiol Soc* 2000;43:765-9.
5. Ntoulia A, Tharakan SJ, Reid JR, Mahboubi S. Failed intussusception reduction in children: correlation between radiologic, surgical, and pathologic findings. *AJR Am J Roentgenol* 2016;207:424-33.
6. Stein-Wexler R, O'Connor R, Daldrup-Link H, Wootton-Gorges SL. Current methods, for reducing intussusception: survey results. *Pediatr Radiol* 2015;45:667-74.
7. Kim YK, Im HR, Lee GH, Han SJ, Sun YH, Roo E, et al. Colon perforation during air enema reduction of intussusception. *J Korean Pediatr Soc* 2003;46:37-41.
8. Sadigh G, Zou KH, Razavi SA, Khan R, Applegate KE. Meta-analysis of air versus liquid enema for intussusception reduction in children. *AJR Am J Roentgenol* 2015;205:W542-9.
9. Lee EH, Yang HR. Nationwide population-based epidemiologic study on childhood intussusception in South Korea: emphasis on treatment and outcomes. *Pediatr Gastroenterol Hepatol Nutr* 2020;23:329-45.
10. Kim PH, Hwang J, Yoon HM, Lee JY, Jung AY, Lee JS, et al. Predictors of failed enema reduction in children with intussusception: a systematic review and meta-analysis. *Eur Radiol* 2021;31:8081-97.
11. Raval MV, Minneci PC, Deans KJ, Kurtovic KJ, Dietrich A, Bates DG, et al. Improving quality and efficiency for intussusception management after successful enema reduction. *Pediatrics* 2015;136:e1345-52.

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