PLACE OF NON-SURGICAL TREATMENT IN THE MANAGEMENT OF ACUTE INTESTINAL INTUSSUSCEPTIONS IN INFANTS

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ABSTRACT :

Objective of the Study To investigate the place of the non-surgical approach in the management of cases of acute intestinal invaginations of the novice

Patients and Method: A retrospective study was conducted over a seven-year period from January 2017 to December 2023 enrolling 187 patients who benefited from therapeutic take-up of their lower left sided water bowel injuries surgical approach

Results: We reviewed 187 patients.The mean age was 11.09 months with ranges of 02 months and 23 months.The sex-ratio was 1.71. 31 infants underwent initial surgery saw an altered general condition with signs of peritoneal irritation .156 infants benefited from nonsurgical reduction with a success rate of 29% on success of 82.6%.Operated after failure of hydrostatic reduction.

Conclusion: Nonsurgical treatment by hydrostatic lavage should be systematically attempted before all cases of breastfeeding AII unless a contraindication arises.Hydrostatic reduction is a non-invasive, effective therapeutic method and has a relatively high success rate at University Hospital of Oran. Surgical approach should be reserved for complicated or advanced cases.

KeyWords:*Acute intussusception, diagnostic time, effectiveness, hydrostatic bowel disintussusception, infants, pudding, ultrasound.*

INTRODUCTION :

Acute intestinal intussusception (AII) remains a benign and common pathology commonly encountered by pediatric surgeons, pediatricians and general practitioners, due to its clinical expression which is often confused with general pediatric pathology. AII can have very polymorphic clinical pictures ranging from simple refusal to eat to intestinal obstruction with septic shock due to intestinal necrosis leading to the death of the infant **[1].** It is one of the most common causes of intestinal obstruction in infants and children **[2].** It constitutes a diagnostic and therapeutic emergency **[1, 2,3].** Its prognosis depends essentially on the early diagnosis and therapeutic management. The overall incidence of AII varies according to the geographical area and the level of health care of the population. There are two types of acute intestinal intussusception **[4]**: idiopathic AII; This is the infant form, it represents nearly 95% of all acute intestinal intussusceptions in children and secondary AII which is due to an isolated local lesion or which is part of a more general pathology of the digestive tract or occurring in a particular context, they represent less than 5% of all cases in children. The diagnosis of idiopathic AII is easy in an infant who presents with paroxysmal abdominal pain, vomiting, and rectal bleeding. Indeed, the association of these symptoms constitutes the classic Ombredanne Triad which is found in 20% of cases **[5].** Unfortunately, this symptomatology can be atypical or poorly understood, leading to misdiagnosis **[5].** Ultrasound is the essential complementary examination for the diagnosis and treatment of AII, in fact its sensitivity is around 92% of cases. It allows a positive diagnosis to be made and it also confirms the disappearance of the intussusception after non-surgical treatment **[6].** The treatment of AII consists of reducing the intussusception. Different therapeutic procedures have been developed around the world to ensure effective and safe treatment of AII. This reduction can be surgical or non-surgical; This is hydrostatic or pneumatic reduction. Pneumatic reduction has been widely developed in the United States and China since the 1980s. In Europe, many authors recommend hydrostatic reduction, which they find more practical, especially when combined with ultrasonic control (abdominal ultrasound). The objective of this work was to take stock of the 7 years of hydrostatic and/or

surgical disinvagination activities at the pediatric surgery clinic of Oran University Hospital with a view to contributing to better management of AII.

MATERIALS AND METHODS:

This is a descriptive retrospective study over a period of seven years, from January 1, 2017 to December 31, 2023, involving a total of 187 infants aged 2 months to 2 years, who received therapeutic management of their acute intestinal intussusceptions. Intestinal disintussusception was performed either by ultrasound-guided hydrostatic enema or by surgical approach as a first or second intention and performed in the medical and surgical emergency department of Oran University Hospital. Included in the study were all patients referred to the pediatric medical and surgical emergency department of Oran University Hospital, in whom the diagnosis of AII was suggested by ultrasound, who received therapeutic management either by hydrostatic enema either by surgery and whose clinical records, ultrasound and disinvagination reports were available and usable. Patients who had associated serious pathologies or congenital malformations were excluded from the study. Similarly, patients whose sociodemographic data and ultrasound and disinvagination reports were incomplete or unavailable were not included in our sample. The ultrasound exploration for both the diagnosis of intussusception and the hydrostatic reduction of the sausage was performed using a General Electric Logic 9 ultrasound scanner equipped with two probes : one high frequency (9 to 12 MHz) and the other deep, 3.5 MHz. In the absence of contraindication, this reduction was performed by the pediatric surgeon. Second-line surgery was reserved for cases of failure of hydrostatic reduction. First-line surgery was indicated for infants presenting a deterioration in general condition or signs of peritoneal irritation. Failure of disinvagination is confirmed after two inconclusive reduction attempts lasting a total of 20 minutes. Clinically, the disappearance or regression of pain, the resumption of eating and normal transit will be assessed. An ultrasound check is carried out within the following 24 hours.

The data for our study were collected on survey forms in the imaging and surgery departments of Oran University Hospital from patients' clinical records, ultrasound and disinvagination reports.

The following variables were studied:

-Epidemiological variables : sex, annual and seasonal distribution.

-Clinical variables : altered general condition or not, presence or absence of pneumoperitoneum, duration of clinical symptoms, type of infant feeding.

-Therapeutic variables : number of infants operated on first and second intention, number and success rate of hydrostatic reduction. And the macroscopic result of surgery by evaluation of the number and percentage of intestinal necrosis.

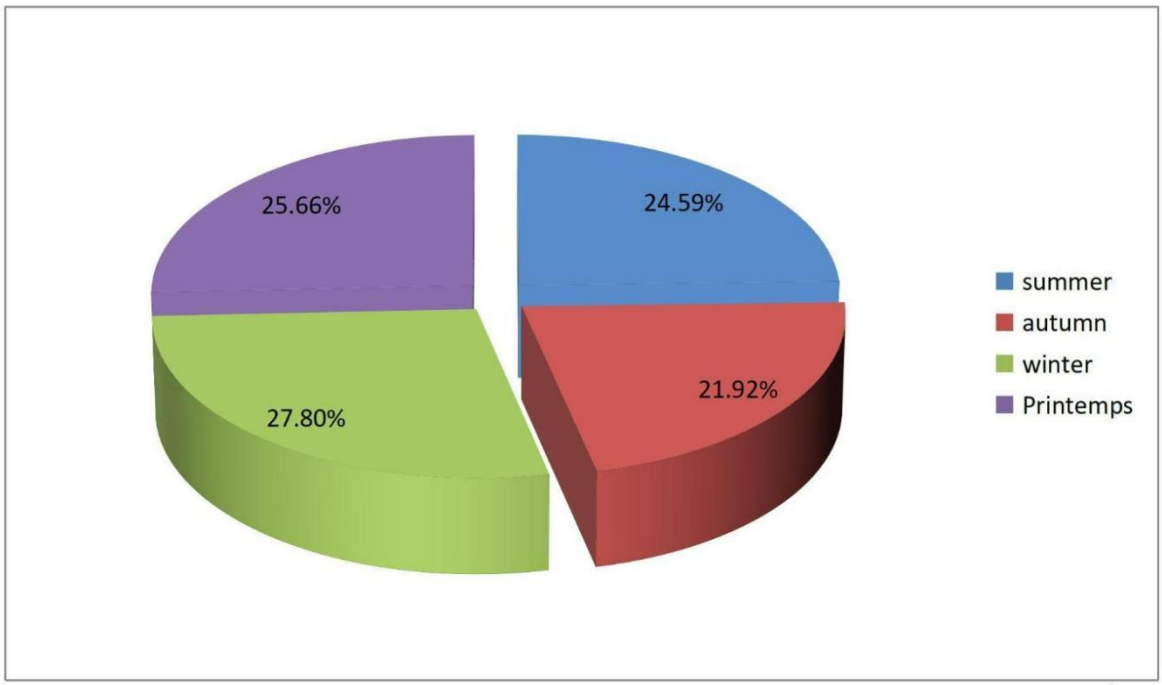
Data entry and analysis were done using EPI INFO software version 7.2.2.6 and Microsoft Excel version 2016.

RESULTS :

One hundred and eighty-seven (187) patients in whom the diagnosis of AII was suggested by ultrasound received therapeutic management, i.e. an average frequency of 26.71 cases/year and one (2.22) patient per month *(Table 1).* The distribution according to the seasons confirms a slight predominance of the winter-spring period *(Graph 1).* The average age of the patients was 11.09 months with extremes of 02 months and 23 months. There were 118 male patients and 69 female patients, i.e. a sex ratio of 1.71 *(Table 2).* The majority of our patients were under 12 months old.

Table 1 : Distribution of numbers (N=187) by year.

Year	Staff	Percentage
2017	19	10.16%
2018	23	12.29%
2019	21	11.22%
2020	18	9.62%
2021	30	16.04%
2022	33	17.64%
2023	43	22.99%
Total	187	100%



Graph 1 : Distribution of cases (N=187) according to the seasons of the year.

Table 2 : Distribution of cases (N=187) according to gender.

Sex	Effective	Percentage
male	118	63.1%
female	69	36.89%
total	187	100%

Infant feeding was mixed or artificial for more than 82% of the population *(Table 3).*

Table 3 : Distribution of cases (N=187) according to the type of infant feeding.

Food	Staff	Percentage
Exclusive Kindergarten	33	17.6%
Mixed	77	41.2%
Artificial	77	41.2%
Total	187	100%

Table 4 : Distribution of cases (N=187) according to general signs.

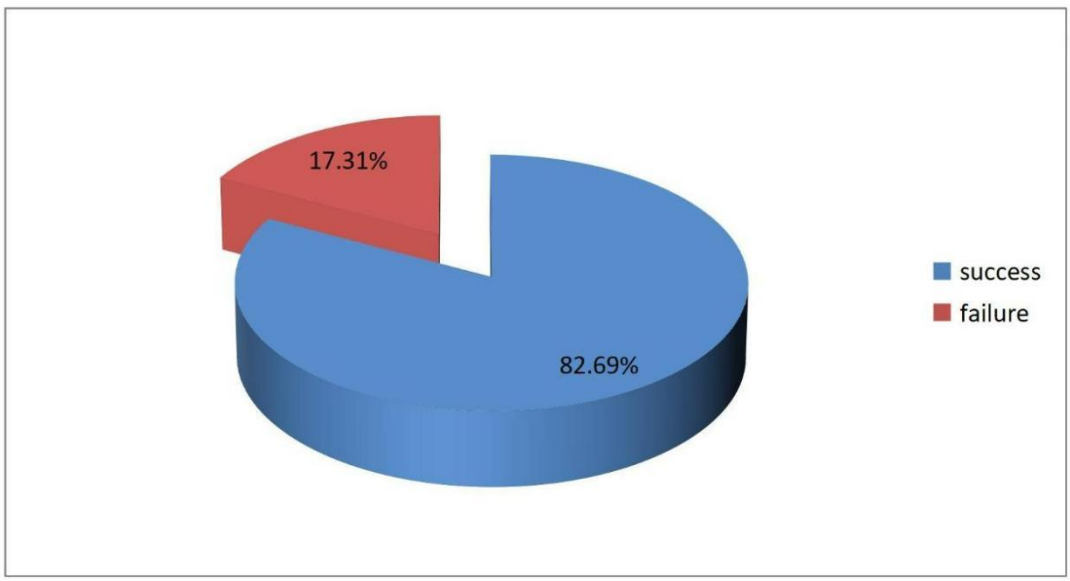
General signs	Staff	Percentage
General condition good	154	82.4%
General condition alteration	31	17.64%
Asthenia	43	23.0%
Dehydration	73	39.0%
Pallor	28	14.97%
Fever	48	25.7%
Hypotonia	37	19.78%
Convulsions	0	0%

The general condition of the infants remained intact in 154 patients, i.e. more than 82% of the population, compared with a deterioration in the general condition in 31 patients, i.e. 17.64% *(Table 4)*.

Table 5 : Distribution of cases (N=187) according to the final therapeutic choice.

Type of treatment	Staff	Percentage
Non-surgical	129	68.98%
Surgical	58	31.01%
total	187	100%

The therapeutic choice was immediately surgical in 31 infants whose general condition was found to be impaired, and 27 infants were operated on secondarily after failure of the non-surgical approach. That is a total of 31.01% of the population. 129 hydrostatic reductions performed in infants whose general condition remained preserved, that is 68.98%. Non-surgical treatment was effective in 129 infants, that is nearly 69% of the population. Hydrostatic reduction was effective in 129 infants out of a total of 158 attempts, that is 82.69% of the population. *(Table 5 and 6) (Graph 2)*



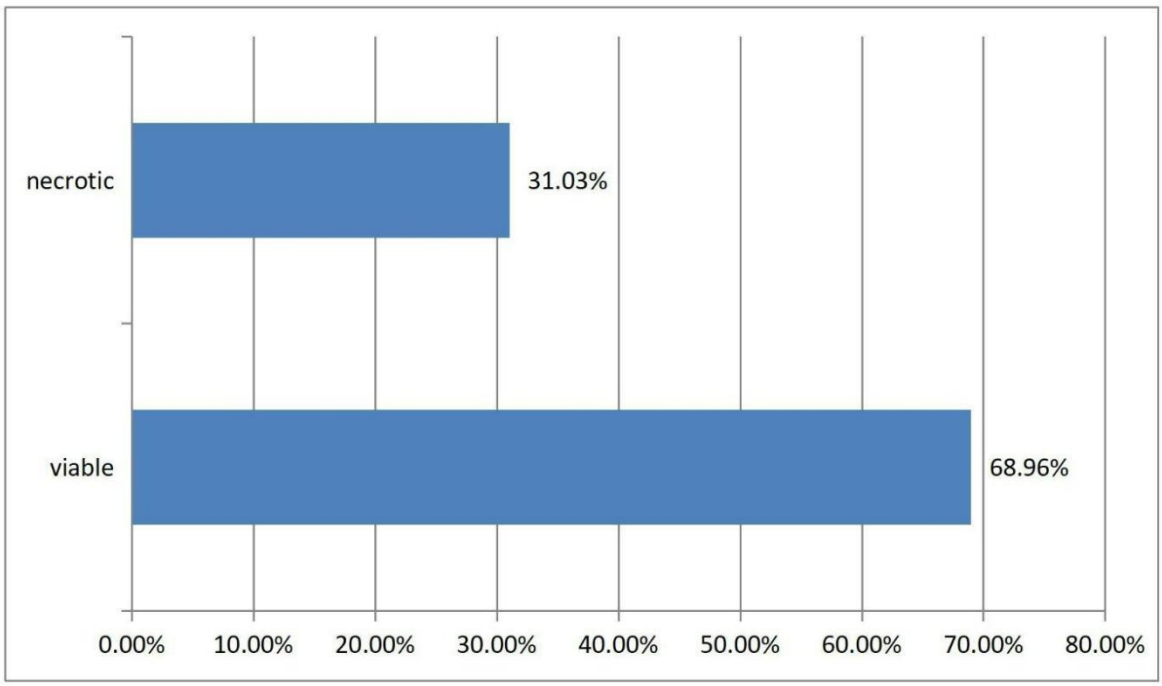
Graph 2 : Distribution of cases (n=156) according to the effectiveness of non-surgical treatment.

Table 6 : Distribution of cases (n=58) according to the number of cases operated on first and second intention

Surgical treatment	Staff	Percentage
Surgery as first line	31	53.44%
Second-line surgery	27	46.55%
Total	58	100%

31 infants underwent primary surgery; 2 due to pneumoperitoneum (digestive perforation with radiological pneumoperitoneum) and 29 due to significant deterioration in general condition with signs of shock.

Finally, out of a total of 58 infants operated on as first or second intention, 18 patients presented intestinal necrosis, i.e. 31.03% of the population *(Graph 3)*.



Graph 3 : Distribution of cases (n=58) according to intestinal viability.

DISCUSSION:

A clear predominance of patients under 12 months (59.35% of cases) was noted and the male sex was the most frequent, i.e. 63.1% with a sex ratio of 1.7.

The principle of treatment of acute intestinal intussusception is the reduction of the telescoped upstream loops into a downstream loop. Surgical or non-surgical, the two methods that were once opposed have become complementary. Surgery comes to save an attempt at a non-surgical approach. Surgery retains its place when all other methods are contraindicated or unavailable.

In developed countries, non-surgical treatment for idiopathic forms in infants remains predominant due to the availability of diagnostic and therapeutic means, a short diagnostic and treatment time and therefore the rarity of advanced and serious forms. In Algeria, a developing country, more and more pediatric surgery departments are beginning to develop non-surgical treatments thanks to the opening of several medical-surgical emergency units equipped with equipment and human resources. In some still remote regions, the low socioeconomic level and difficult access to care often delay diagnosis and treatment, leading to advanced forms for which surgical sanction becomes imperative.

At Oran University Hospital, the opening of a new pediatric medical-surgical emergency department has greatly contributed to improving the care of children and, among others, infants with IIA. Our department is giving itself the means to implement its policy, radiology open 24 hours a day with standard digitalized radiography, latest generation general ultrasound, and computed tomography unit have greatly contributed to facilitating the work of pediatric surgeons. We are at almost 70% of IIA cases treated by hydrostatic reduction, which corresponds to what is best in the field. The success rate of ultrasound-guided hydrostatic disinvagination was relatively high at 82.69%. *Table 7* compares global success rates. Charles reports an 80% success rate by hydrostatic enema **[7].** Others Authors such as Cissé and Nikiéma had reported success rates of 100% each **[8, 9].** Zoëtgnandé had noted a success rate of 43.70 % **[10].** Fatima in Morocco had also noted a high success rate, namely 94% **[11]**

Table 7 : Comparative success rate of hydrostatic reduction.

Authors	Staff	Hydraulic enema success rate
J.Khorana [12] (India)	170	44%
Sadigh et al. [13]	32451	69.6%
Charles et al. [7]	150	80%
Our series (2024)	156	82.69%

CONCLUSION:

Ultrasound-guided hydrostatic reduction remains a simple, safe, effective, economical and reproducible method for the treatment of uncomplicated forms of IIA. Intussusceptions were more frequently located in the ileocecal region. The reduction was performed with a relatively high success rate at the Oran University Hospital and exclusively concerned patients under 24 months of age. The success rate of this reduction was high when the treatment time was less than 24 hours. The reduction is thus easy and simple to obtain when the diagnosis of IIA is suggested early and treatment initiated within a short period of time. In our context, this therapeutic method could be performed in all health facilities equipped with an ultrasound scanner, adequate disinvagination equipment , by an experienced pediatric surgeon. Also, the prognosis of IIA could be excellent, at the cost of close collaboration between pediatricians, pediatric surgeons, radiologists and pediatric anesthesiologists-resuscitators.

Conflict of interest

The authors declare that they have no conflict of interest.

REFERENCES

1. **Helardot, P. G.** (1990). Acute intestinal intussusception. In *Digestive surgery of children* (pp. 437–447). Paris.

2. **Grosfeld, J. L.** (2005). Intussusception then and now: An historical vignette. *Journal of the American College of Surgeons, 201*(6), 830–833. https://doi.org/10.1016/j.jamcollsurg.2005.04.016

3. **Bogdanović, M., Blagojević, M., Kuzmanović, J., Ječmenica, D., & Alempijević, Đ.** (2019). Fatal intussusception in infancy: Forensic implications. *Forensic Science, Medicine, and Pathology, 15*(2), 284–287. https://doi.org/10.1007/s12024-018-0039-y

4. **De Lambert, G., et al.** (2015). Acute intestinal intussusception in infants and children. *Journal of Pediatrics and Child Health*. https://doi.org/10.1016/j.jpp.2015.04.001

5. **Vandertuin, L., et al.** (2011). Intussusception in children: A truly classic triad? *Rev Med, 7*, 283–451. https://doi.org/10.53738/REVMED.2011.7.283.0451

6. **Mandeville, K., Chien, M., Willyerd, F. A., Mandell, G., Hostetler, M. A., & Bulloch, B. (**2012). Intussusception: Clinical presentations and imaging characteristics. *Pediatric Emergency Care, 28*(9), 842–844. https://doi.org/10.1097/PEC.0b013e318267a75e

7. **Charles, T., Penninga, L., Reurings, J. C., & Berry, M. C.** (2015). Intussusception in children: A clinical review. *Acta Chirurgica Belgica, 115*(5), 327–333. https://doi.org/10.1080/00015458.2015.11681124

8. **Cissé, R., Wandaogo, A., Bandré, E., Lougué, C., Tapsoba, T. L., Sano, D., et al.** (2023). Intestinal disinvagination by warm isotonic saline enema under ultrasound control: Results. *Journal of African Imaging Medicine, 15*(1), 1–7.

9. **Nikiéma, Z., Traoré, S. S., Zoromé, B., Sanou, G. B., Lougué, C., & Cissé, R.** (n.d.). Hydrostatic reduction with isotonic saline solution of intestinal intussusceptions in children: A report of 11 cases. *Science and Technology, Health Sciences, 32*, 8p.

10. **Zoetgandé, G.** (2018). Acute intestinal intussusceptions in children aged 0 to 15 years in the city of Ouagadougou: Epidemiological, diagnostic, and therapeutic aspects at the Charles de Gaulle University Hospital. *Thesis, UJKZ Burkina Faso*, No. 150, 138p.

11. **ZB, F. (**2014). Ultrasound-guided water reduction of acute intestinal intussusception in infants. *Medical thesis*, Mohamed V Souissi University, Faculty of Medicine, Rabat, Morocco, 154p.

12. **Khorana, J., Singhavejsakul, J., Ukarapol, N., Laohapensang, M., Wakhanrittee, J., & Patumanond, E.** (2015). Enema reduction of intussusception: The success rate of hydrostatic and pneumatic reduction. *Therapeutics and Clinical Risk Management, 11*, 1837–1842. https://doi.org/10.2147/TCRM.592169

13. **Sadigh, G., Zou, K. H., Razavi, S. A., Khan, R., & Applegate, K. E.** (2015). Meta-analysis of air versus liquid enema for intussusception reduction in children. *AJR American Journal of Roentgenology, 205*(5), W542–W549. https://doi.org/10.2214/AJR.14.14060