

Sonographically detected thickened small bowel in a case of paediatric *Salmonella Typhimurium* enteritis

Abstract

Introduction: A five-year-old year old girl developed fever of 40.3° C, vomiting, mild general abdominal pain, followed by bloody diarrhea.

Description: Ultrasonography revealed a length of symmetrically thickened terminal ileum, more than 20 cm long, with walls greater than 0.5 cm containing a long narrow lumen < 1 mm wide.

Conclusion: Given the difficulty of diagnosing the cause of enteritis in young children, ultrasonography represents a simple, non invasive technique which may demonstrate suggestive mural thickening.

Keywords: enteritis, salmonella, salmonellosis, typhimurium.

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Introduction

Infections with non typhoidal salmonellae (NTS), in particular the Serovar Typhimurium, are increasing in Australia. Classically, they cause an acute enteritis but symptoms and signs may be minimal and in a young child it may be difficult to distinguish this enteritis from appendicitis. Ultrasonography has been widely reported as useful in appendicitis but rarely in *S. Typhimurium* infections. We report a child infected with *S. Typhimurium* who was mildly ill but with gross signs on ultrasonography.

Three days after a take-away chicken lunch, the five-year-old year old girl developed fever of 40.3° C, vomiting, mild general abdominal pain, followed by bloody diarrhoea. She was not clinically dehydrated and abdominal examination only revealed mild, generalised abdominal tenderness with normal bowel sounds. Her stools were watery with bright blood but no mucus. Her blood count was normal but the inflammatory marker, C reactive protein (CRP), was markedly elevated at 245 mg/dL.

Ultrasonography revealed a length of symmetrically thickened terminal ileum, more than 20 cm long, with walls greater than 0.5 cm containing a long narrow lumen < 1 mm wide. There was a small amount of free fluid and mild enlargement of mesenteric lymph nodes. Neither the appendix nor the colon was abnormal.

It was assumed she had an acute infection superimposed on chronic inflammatory bowel disease and ceftazidime and Flagyl were given. She improved clinically overnight and was permitted a light diet because of her insistent appetite. By the third day she was well, and by the seventh day her CRP and ultrasound examination had also returned to normal. Blood cultures grew

no organisms but *S. Typhimurium* was cultured from stool.

Discussion

The incidence of NTS has steadily increased in Australia from 6,453 in 1991 to 11,270 in 2012. Most are due to the serovar *S. Typhimurium* and most have occurred in children < 14 yr. In 2012, for example, of the 1576 cases reported to the NSW Ministry of Health, 1093 were in children < 14 years, with 688 in children from 0–4 years and 271 in those from 5–9.¹ To gain perspective on the frequency of NTS infections in children 0–4 years, in a similar period, 682 infections with rotavirus and 697 with whooping cough were reported to the NSW Ministry of Health.

This increased incidence has been observed in many parts of the world, perhaps reflecting intensive animal husbandry involving antibacterial use, and the evolution of drug-resistant forms of this food-borne disease. In Australia, most infections have been associated with ingestion of egg and chicken vectors.

In Africa, where NTS now ranks in the three most common causes of blood stream infections in adults and children, drinking contaminated water and handling contaminated animals add to the food-borne burden.²

In developed countries, NTS infections classically present as acute enteritis with fever, nausea, vomiting and abdominal pain, followed by diarrhoea which is often blood-stained.

Associated bacteraemia is uncommon, occurring in 1–5% of affected children.³ In Africa, however, rates of bacteraemia have been 10 times higher, associated with pneumonia, meningitis and osteoarthritis, and a predictably high mortality.

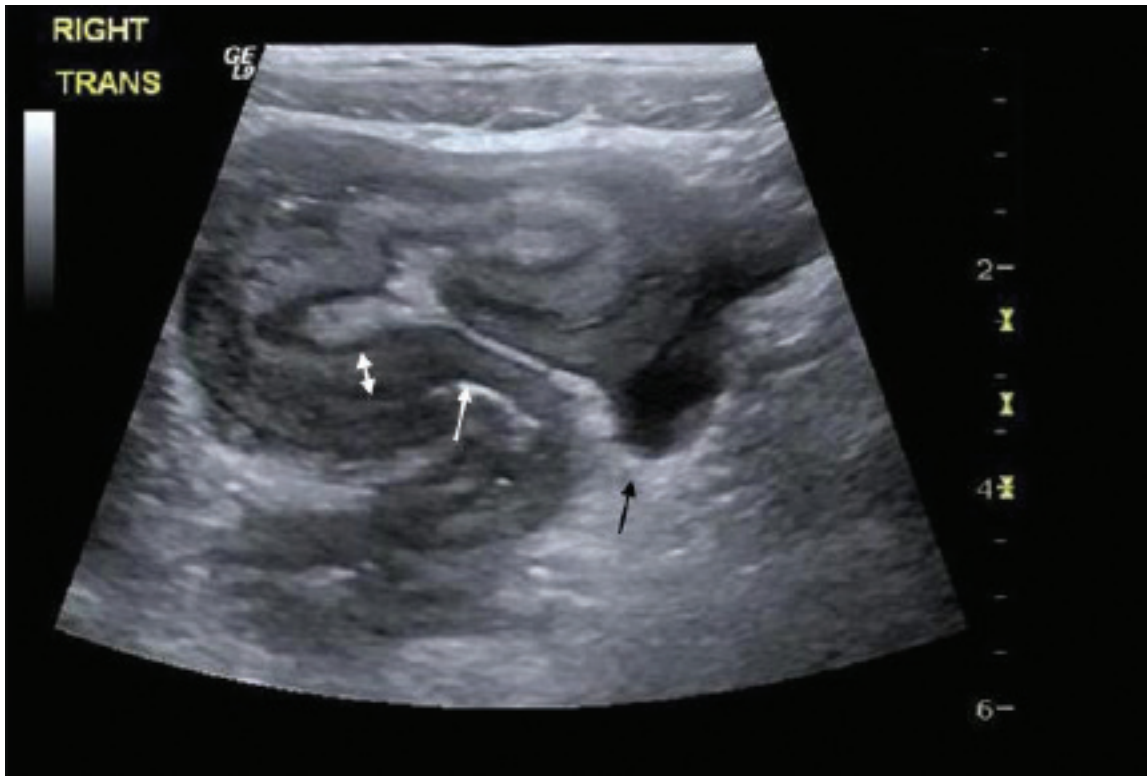


Figure 1: Thickened length of small bowel (> 1 cm thickness: double-headed white arrow) with lumen < 1 mm (single-headed white arrow) associated with free fluid (black arrow).

As with appendicitis, the diagnosis of NTS in children under 5 years old may be difficult. Though the organisms provoke a marked, localised inflammatory response that thickens the walls of the terminal ileum and enlarges draining lymph nodes, symptoms and signs may be diffuse and mild, even with associated bacteraemia. This presentation is different from classical *S. Typhi* which, in the early stages, provokes less response in the bowel but a greater systemic response.

Despite the frequency of *S. Typhimurium* infections and their proclivity for the terminal ileum, their ultrasound findings have not been well documented, compared to those of appendicitis,⁴ suggesting an underused modality. Ueda, *et al.* reported mean colonic thickening of 6.8 mm, associated with free fluid, in children ranging from 1–4 yrs infected with *S. Typhimurium*, but did not comment on the length involved.⁵ Also without commenting on the length, Kobayashi, *et al.*⁶ reported thickening of the terminal ileum infected with *S. Typhimurium* to be greater than that infected with *S. Typhi* and *Campylobacter* (mean 11.8 vs 4.8 vs 9.8 mm). Our child had at least 20 cm of thickened bowel with such a narrowed lumen it was surprising she demanded and tolerated feeds from the second day.

There are numerous causes of thickened bowel wall, including chronic inflammatory disease, malignancy and other infiltrative processes, ischaemia and other infectious enteritides. The complete resolution of clinical and sonographic signs in association with the identified bacterium confirmed the relatively benign diagnosis in our child.

Conclusion

Given the rise in NTS infections, and the difficulty of diagnosing the cause of enteritis in young children, ultrasonography represents a simple, non invasive technique which may

demonstrate suggestive mural thickening. Despite gross signs, however, the outcome may be uncomplicated.

Key learning points

- 1 NTS may cause enteritis.
- 2 It is usually associated with fever, vomiting, pain and blood stained diarrhoea.
- 3 In our population it is generally a self-limiting illness.
- 4 The incidence of NTS (usually *S. Typhimurium*) is increasing.
- 5 In young children, ultrasound may reveal marked mural thickening of the terminal ileum, even in those with minimal clinical disorder.
- 6 Bowel thickening is a non-specific finding and careful clinical correlation and follow-up is advised.

References

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