

## Case Report

# Gastrointestinal Bullet Embolism with Spontaneous Expulsion of the Projectile

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**Keywords**

Ballistic trauma  
Gastrointestinal pathology  
Bullet embolism  
Gastric perforation  
Gunshot injury  
Intestinal foreign body

**Abstract**

*A 5-year-old girl was admitted with signs of peritonitis following gunshot injury of the abdomen. At laparotomy, a perforation of 1.5 cm diameter on the greater curvature of stomach was noted. Intraoperatively the projectile could not be located and hence gastrorrhaphy was performed. Postoperatively, a plain abdominal radiograph revealed the presence of a projectile in the abdomen. The patient resumed intestinal motility with diarrhea on the postoperative day-4. The bullet was spontaneously expelled during defecation on the postoperative day-7 and the diarrhea resolved on the postoperative day-11. Gastrointestinal bullet embolism with spontaneous expulsion of the bullet is a very rare phenomenon.*

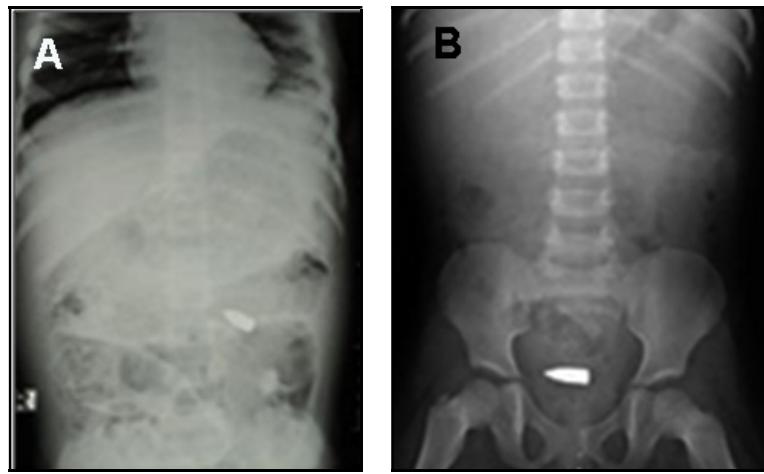
**INTRODUCTION**

Bullet embolism is a rare phenomenon that occurs when a penetrating bullet migrates away from its original entry point through the anatomical channels of the body.<sup>(1,2)</sup> Most of the cases of bullet embolism are either vascular or gastrointestinal in nature.<sup>(2)</sup> Cases of bullet migration within the gastrointestinal tract and their spontaneous expulsion through the anus are extremely rare.<sup>(3-6)</sup>

Herein, we report one such case of bullet embolism in a 5-year-old child.

**CASE REPORT**

A 5-year-old girl was admitted to the surgical emergency department with abdominal gunshot wound from a terrorist attack. On examination, she was conscious, but hemodynamically unstable. Abdominal examination revealed signs of peritonitis. Temperature was 38.3°C, pulse was 146/min



**Fig 1.** Projectile located in the left flank on the postoperative day 2 (A) and it migrated to the pelvis on the post-operative day-5 (B)

and respiratory rate was 56/min. A single, bullet-entry hole over the left anterior chest wall was noticed. The entry wound was oval in shape with a diameter of 1.5cm. There was no hemothorax or pneumothorax. The pre-operative laboratory test revealed hemoglobin of 9.5 g/dl, white blood cells of 9920/mm<sup>3</sup>, hematocrit of 28% and platelets of 372 x10<sup>3</sup>/mm<sup>3</sup>. Plain abdominal radiograph and chest X-ray were not available in the emergency department.

After fluid resuscitation, laparotomy was performed. Intra-operatively a perforation of about 1.5 cm of diameter on the greater curvature of stomach was identified. There was also a splenic injury of Grade II (Moore's classification), without active bleeding. There was no breach of the diaphragm. A search for the projectile was negative. The gastric perforation was repaired.

Patient developed respiratory distress 24 hours after the laparotomy. She had crepitating rales in the left lung with a SaO<sub>2</sub> of 88% on room air. Oxygen was administered. Postoperative investigations revealed a hemoglobin level of 5.9 g/dl and leukocyte count was 12,510/mm<sup>3</sup>. On post-operative day-2, a plain abdominal radiograph revealed the presence of a projectile in the abdomen. (Fig.1A) A follow-up radiograph on the post-

operative day-5 showed that the bullet had migrated to the pelvis. (Fig.1B)

A chest X-ray showed consolidation of the left lung base. Gentamicin was added to the postoperative mediation. The patient resumed intestinal motility with diarrhea on the postoperative day-4. The bullet was expelled on the postoperative day-7 (Fig.2) and the diarrhea improved on the post-operative day-11. Upon improvement of clinical condition, she was discharged on the postoperative day-17.



**Fig.2** Bullet expelled in stools

## DISCUSSION

In the Western Africa, that is affected by terrorism and civil war, the incidence of abdominal gunshot wounds is high.<sup>(7)</sup> With the advent of terrorist attacks, daily statistics in our setting shows a significant increase in the incidence of ballistic trauma since 2015. The northern part of Burkina Faso is one of the regions that is most affected by

terrorism. Children are most often the victims of stray bullets.

Spontaneous migration of a retained bullet is a rare phenomenon.<sup>(1)</sup> This phenomenon occurs when a bullet that penetrates the body is stalled on its pathway and is secondarily carried away from its initial location to a distant site through the luminal structures of the body.<sup>(2)</sup> The first descriptions of this phenomenon concerned with intravascular bullet embolism was reported by Thomas Davis in 1834.<sup>(2)</sup> Vascular embolism is the most common form of bullet embolism.<sup>(2)</sup>

Gastrointestinal bullet embolism is an extremely rare phenomenon, even more rare than vascular bullet embolism.<sup>(1)</sup> It is rare for a bullet to get stalled in the lumen of gastrointestinal tract.<sup>(1)</sup> However, a bullet retained in the gastrointestinal tract of survivor may migrate along the lumen, propelled by intestinal peristalsis.<sup>(1)</sup> On reviewing the literature, only 8 cases of bullet migration through the gastrointestinal tract could be found.<sup>(1-6, 8, 9)</sup> Among them, there were only 4 cases of spontaneous bullet expulsion during defecation.<sup>(3-6)</sup> The first case of spontaneous expulsion of a projectile through the anus was reported in 1977 by Weithofer.<sup>(3)</sup> This was a projectile impacted in the duodenum and the common bile duct for 32 years and was expelled spontaneously during defecation. The case reported by Tebbett<sup>(5)</sup> is similar to that of our patient. Wani<sup>(6)</sup> reported an exceptional case of spontaneous bullet expulsion through the anus, in which the gunshot wound was in the chest, and the bullet was lodged near the postero-lateral wall of the trachea. The patient finally coughed up and ingested the bullet before it was expelled in the stool.<sup>(6)</sup>

In the present case, after penetrating the stomach, the bullet migrated progressively over 7 days within the gastrointestinal tract before being expelled in stools. Intestinal peristalsis might have facilitated the migration and expulsion of the bullet.<sup>(1)</sup> In addition, handling of the gut during

laparotomy may also have caused the migration.<sup>(5)</sup> The paralytic ileus due to acute generalized peritonitis certainly prolonged the expulsion time.

In the background of hemodynamic instability, signs of infection and features of peritonitis, an emergency laparotomy was performed to assess the lesions. This is fully justified in the absence of sophisticated imaging facilities.

The physical appearance of the projectile (Fig.2) and the damage caused to the body indicate that it must have been shot from a high-velocity weapon from a distant point. The particularity of this trauma is that the bullet shot from a far distance, having passed through the tissues of different densities, will be unstable. This will limit the resultant tissue damage. After penetrating the stomach wall, the projectile, no longer possessing sufficient energy, must have been lodged in the pyloric lumen. As the projectile is contaminated, it could have resulted in enteritis and diarrhea. Although rare, pediatric surgeons must be aware of bullet embolism. A simple X-ray may be sufficient to follow the migration of the projectile.

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#### CHIEF EDITOR'S COMMENTS

It is a big surprise to know that there are resource-limited settings where even simple imaging facilities such as x-rays are not available for an emergency diagnosis, and surgeons have to work without this basic investigation. We must applaud the initiative taken by the authors from Burkina Faso that resulted in good outcome of the patient.