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Subcutaneous emphysema, pneumomediastinum, pneumothorax, pneumoperitoneum, and pneumoretroperitoneum by insufflation of compressed air at the external genitalia in a child

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Abstract A 7-year-old girl with concurrent subcutaneous emphysema, pneumomediastinum, pneumothorax, pneumoperitoneum, and pneumoretroperitoneum arrived at our facility. Compressed air at 5 atm of pressure was insufflated through the nozzle of a spray gun over her external genitalia. She was admitted for a small amount of genital bleeding and significant subcutaneous emphysema extending from the cheek to the upper body. Radiographic examination of the abdomen was suggestive of a visceral perforation, but she was managed conservatively and discharged in satisfactory condition without surgical intervention. The female genitalia possibly served as the entry point for air into the retroperitoneum and peritoneal cavity, with subsequent migration of air through the esophageal hiatus that resulted in pneumomediastinum, pneumothorax, and extensive subcutaneous emphysema.

Pneumomediastinum, pneumothorax, and pneumoperitoneum are findings that indicate injury to the lung and hollow viscera and usually require surgical intervention. However, there is a subset of patients in whom nonsurgical treatment is appropriate [1]. In such cases, it is very important to understand the *incursion* mechanism and the route of air migration to avoid an unnecessary laparotomy. We describe an unusual case of extensive subcutaneous emphysema, pneumothorax, pneumomediastinum, pneumoperitoneum, and retroperitoneal air caused by insufflation of compressed air over the genital region in a child. The female genital tract may serve as an entry point (vagina, uterus and fallopian tubes) through which air can reach the peritoneal cavity and the retroperitoneal space. This case illustrates the possible pathways of communication between the peritoneal cavity, retroperitoneal space, mediastinum, and the thorax.

1. Case report

A 7-year-old girl was admitted for facial swelling and a small amount of genital bleeding. Her father jokingly sprayed compressed air from a spray gun cleaner onto her nape, back, and buttocks because she interrupted his cleaning

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of a motorbike. Compressed air at 5 atm of pressure was injected through a 2-mm pinehole at the top of the nozzle. As soon as the insufflation occurred, the girl squatted and facial

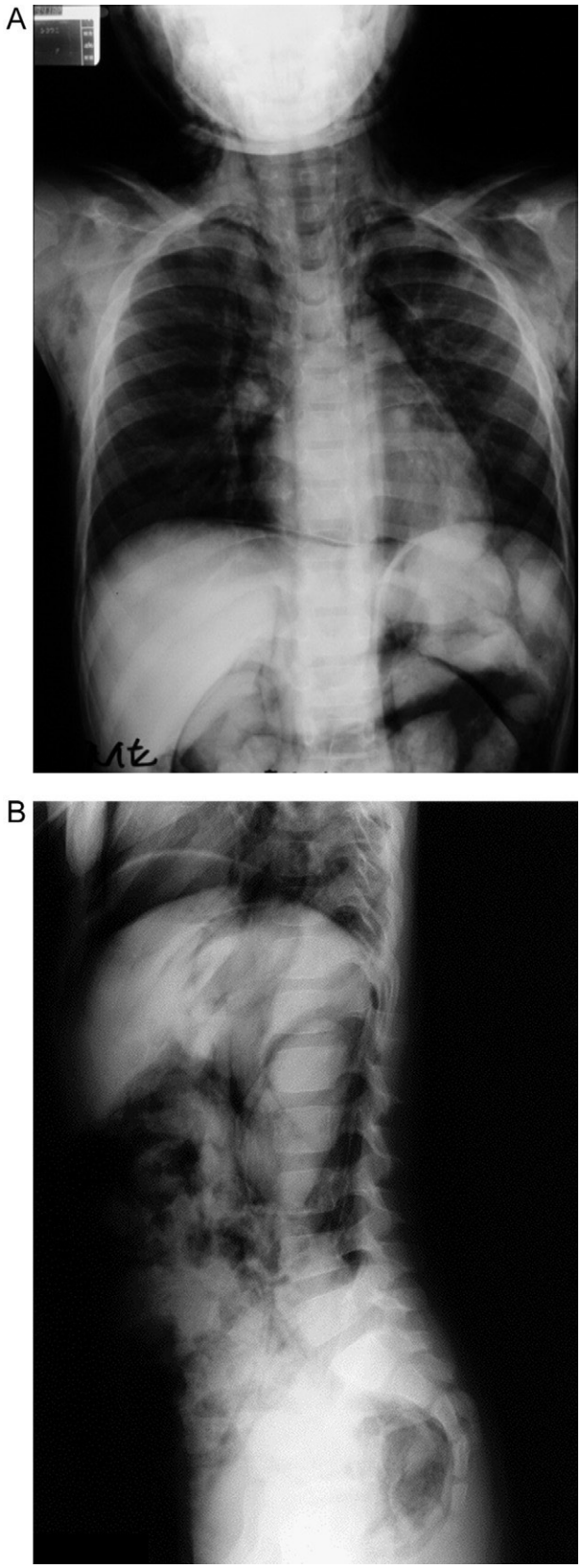

Fig. 1 A, Chest radiograph. Significant subcutaneous emphysema of the neck and chest was noted. Pneumothorax and pneumomediastinum were also observed. Free air was seen under the right diaphragm, and the contour of the kidney was outlined with retroperitoneal gas. B, Abdominal radiograph (lateral view) also showed a large amount of air in the extraperitoneal cavity, pneumoperitoneum, and perirenal free air, indicating pneumoretroperitoneum.

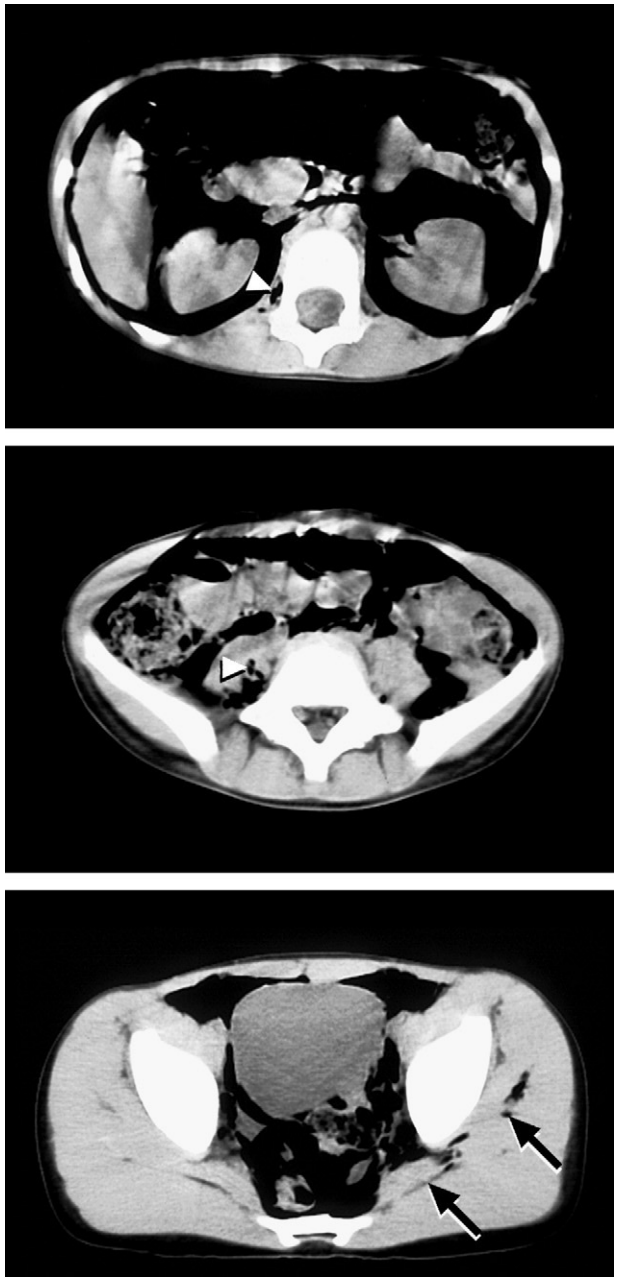

Fig. 2 Serial CT examination of the abdomen. A large amount of the gas was seen in the peritoneal cavity, retroperitoneum, and extraperitoneal cavity of the pelvis. Air spread along the fascia of the psoas muscle (white arrow head) and along the fascia of the gluteal muscle (black arrow), and a small amount of fluid was noted in the Pouch of Douglas. A small amount of air was seen in the vagina.