

# Torsion of the Ovary in an Incarcerated Inguinal Hernia

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**Abstract:** A 2.5-month-old girl with a left-sided, painful inguinal swelling for the last 2 days was brought to the emergency department. After physical examination and radiological evaluation, the diagnosis of incarcerated inguinal hernia of the ovary was made. Because of the long-standing history, she was taken to the operation room without an attempt for manual reduction. Perioperatively, the torsion of the ovary with distal fallopian tube within the indirect hernia sac was seen. As untwisting of the ovary has resulted in no change in the color, oophorectomy before hernia repair was performed.

The majority of the painful inguinal swellings in the infancy are related to incarcerated hernia. The treatment option varies from manual reduction to surgical intervention, depending on the duration from beginning of swelling to the time the exact diagnosis was made. Even though the presence of short-term history and the lack of peritoneal irritation findings are indications for a manual reduction, the suspicion of an ovarian torsion should be raised for ovaries within the incarcerated inguinal hernia, and ovarian viability should be considered before an attempt of manual reduction.

**Key Words:** incarcerated inguinal hernia, necrotic ovary, ovarian torsion  
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Incarceration is the entrapment of an intra-abdominal organ in an indirect inguinal hernia. A delay in the treatment of such a problem causes a vascular compromise at the neck of the hernia sac, and strangulation of the hernia content takes place. The overall incidence of incarceration has been reported to be 6% to 18% in pediatric population and 31% to 40% for neonates and young infants.<sup>1,2</sup>

The therapeutic attempt of an incarcerated inguinal hernia of any segment of bowel for both sexes is straightforward. But the clinical approach of an inguinal hernia (whether sliding or incarcerated) with ovary and fallopian tube in it, even though not rare, is debatable.

The aim of this case report was to present a case of ovarian torsion within an incarcerated inguinal hernia.

## CASE

A 2.5-month-old girl with a left-sided, painful inguinal swelling for the last 2 days was brought to the emergency department (Fig. 1). The parents realized that the swelling was firmer and getting more painful than the previous day. Fussiness, loss of appetite, and nonbilious postprandial vomiting for the last 2 days were also noticed by the parents. The diagnosis of an ovary within the left-sided inguinal hernia was made when she was 25 days old, and she was scheduled for an elective repair of an ovary sliding hernia.

Her physical examination revealed a significant redness with a firm, tender mass at the left inguinal region. Complete

blood count revealed a mild leukocytosis (white blood cells 12,500/ $\mu$ L) with anemia (hemoglobin 8.3 g/dL). The ultrasound examination of the left inguinal region with 7.5-MHz linear probe demonstrated the incarcerated inguinal hernia of the left ovary with a size of 25  $\times$  13 mm. The impairment of the ovarian perfusion was also reported depending on decreased peak systolic blood flow velocity and increased resistivity index from the arteries around the hypoechoic and heterogenous ovarian tissue.

As the viability of the left ovary was suggestive because of the long-lasting history, no attempt for manual reduction was considered. The patient was taken to the operating room for inguinal exploration with the diagnosis of incarcerated inguinal hernia of the ovary. The indirect hernia sac was found to be very edematous and fragile. After a meticulous dissection, the hernia sac was opened, and the necrotic ovary and hemorrhage within the sac were seen (Fig. 2). The left ovary and distal fallopian tube were found to be twisted 720 degrees in the longitudinal axis. Both were untwisted, and as no change in the color of the ovary was observed, an oophorectomy was performed before high ligation. As the postoperative course was uneventful, she was discharged at the first postoperative day.

The macroscopic evaluation revealed an ovary of 3  $\times$  1.5 cm with gross hemorrhage on all sections, and the microscopic evaluation revealed disseminated hemorrhagic necrosis with minimal residual ovarian tissue.

## DISCUSSION

Ovarian content can be found in an indirect hernia sac with an incidence up to 30%.<sup>3</sup> This ovary could act either as a



**FIGURE 1.** The left-sided swelling with significant redness at the inguinal region.

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**FIGURE 2.** The perioperative image of twisted ovary within the hernia sac.

painless, irreducible mass at the inguinal region due to the sliding activity of the ovary or as a painful, erythematous, and edematous bulge due to incarceration, which is less common.

The strangulation of ovary and fallopian tube in a hernia sac is related to the vascular compromise at the internal inguinal ring by the neighboring bowel or omentum. Generally, the sliding ovary and fallopian tube are not at a significant risk of strangulation. The free-floating ovaries can easily protrude to the indirect hernia, and even if they become edematous, they are presented as irreducible painless inguinal masses. But this scenario is not as innocent as it seems. The ovaries in inguinal hernias have a slight chance to strangulate, but have the bad luck to twist. In a clinical series by Boley et al,<sup>4</sup> the incidence of irreducible ovaries was about 4% in 386 girls with inguinal hernias, and in this group of patients, 27% of the girls presented with ovarian torsion. Half of these cases presented with incarceration of the ovary at the first admission, whereas the other half presented with incarceration after the diagnosis of ovarian sliding hernias. Boley et al<sup>4</sup> also reviewed the literature up to 1991 and found that the incidence of strangulation in incarcerated ovaries varies between 2% and 33%. They stated that the interaction of the irreducible, relatively bigger ovary with narrowed, lengthened ovarian pedicle predisposes the twisting of the ovary in the inguinal canal. Also, Merriman and Auld<sup>5</sup> presented 11 cases of ovarian torsion (18.9%) and 4 cases of “probable” strangulation (6.9%) in 58 irreducible ovaries. Takehara et al<sup>3</sup> reviewed 237 girls with inguinal hernias treated laparoscopically and found that 15 cases were presented with irreducible ovaries (6%). Of these 15 cases, 4 cases were presented with torsion. All authors have proposed an early repair for the inguinal hernias with irreducible ovaries to prevent torsion and strangulation.

A mass at the inguinal region is not an uncommon finding in infancy. The differential diagnosis includes a wide spectrum of diseases treated either surgically or nonsurgically. Inguinal hernia (uncomplicated or complicated) is the most common cause of the inguinal masses for both sexes. Also, hydrocele of the canal of Nuck, femoral hernia, epidermal inclusion cysts, cystic lymphangiomas, lymphadenopathy, lymphadenitis, rhabdomyosarcoma, or metastatic tumors can be seen at the inguinal region in girls.<sup>2,6</sup>

In terms of radiological evaluation of the inguinal masses, the ultrasound scan is the least invasive and most helpful imaging modality. The ultrasound allows evaluating both the

nature of the mass and its exact locations with relations to the adjacent tissues. In case of an incarcerated inguinal hernia, ultrasound can be informative for not only the content of the sac, but also the viability of the content. The accuracy of ultrasound for the preoperative diagnosis of palpable mobile inguinal masses was reported to range between 66.7% and 100%.<sup>7,8</sup> Moreover, color Doppler ultrasound may show increased vascularity and decreased resistance index for the vascular compromise. Even though an enlarged ovary with an absent blood flow is the most consistent finding for ovarian torsion, the sensitivity of ultrasound is low for the accurate diagnosis. It is because of the dual vascular supply of the ovary and the loss of venous and lymphatic drainage long before the distinctive decrease in arterial flow.<sup>9</sup>

As aforementioned, the altered ovarian anatomy in the inguinal sac after incarceration results in an interaction of ovary and ovarian pedicle similar to the bell-clapper deformity of the testis, which makes the torsion more likely in the inguinal canal. Moreover, the infantile group is under great risk of ovarian torsion because of the peaking hormone levels of maternal origin at that age.<sup>9</sup> As the torsion occurs, impairment of venous and lymphatic drainage followed by loss of arterial perfusion is seen. In terms of preserving the ovarian tissue, the diagnosis should be made before the necrosis takes place at the ovarian tissue. Prompt diagnosis also protects the infant from catastrophic consequences; as the literature review revealed, a small number of infants presented with sudden death due to undiagnosed ovarian torsion.<sup>10,11</sup> The necrotic ovary within an indirect inguinal hernia is an interesting perioperative finding and more commonly is the result of ovarian torsion rather than an ovarian incarceration. We think that the clinician should be aware of the risks of an entrapped ovary in an incarcerated inguinal hernia and should always consider the ovarian viability before the attempt of a manual reduction.

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