Scientific Research Publishing

Open Journal of Radiology, 2025, 15(4), 194-200
https://www.scirp.org/journal/ojrad
ISSN Online: 2164-3032
ISSN Print: 2164-3024

Antenatal Ultrasound Diagnosis of Intestinal Atresia: About Six Cases at Bouake Chu

Brou Lambert Yao[1,2*], Sara Carole Sanogo[1], Bouassa Davy Mélaine Kouakou[1], Malick Soro[1], Akoli Eklou Baudouin Bravo-Tsri[1,2], Kouamé Paul Bon-Fils Kouassi[1,2], Kesse Emile Tanoh[1,2], Allou Florent Kouadio[1,2], Issa Konate[1,2]

[1]Radiodiagnostic and Medical Imaging Department, Bouaké University Hospital Center, Bouaké, Côte d'Ivoire
[2]Faculty of Medical Sciences, Alassane Ouattara University of Bouaké, Bouaké, Côte d'Ivoire
Email: *yaobroul@yahoo.fr, medecinsara1991@gmail.com, bouassakdav@gmail.com, soro.malick92@gmail.com, bravotsri2006@gmail.com, Kwessmaillet@yahoo.fr, tkemiles@yahoo.fr, alloukadjo04@gmail.com, Ikttata6@gmail.com

How to cite this paper: Yao, B.L., Sanogo, S.C., Kouakou, B.D.M., Soro, M., Bravo-Tsri, A.E.B., Kouassi, K.P.B.-F., Tanoh, K.E., Kouadio, A.F. and Konate, I. (2025) Antenatal Ultrasound Diagnosis of Intestinal Atresia: About Six Cases at Bouake Chu. *Open Journal of Radiology*, **15**, 194-200.
https://doi.org/10.4236/ojrad.2025.154021

Received: August 9, 2025
Accepted: December 7, 2025
Published: December 10, 2025

Abstract

Intestinal atresias are rare but serious congenital malformations of the digestive tract. Early treatment involves antenatal ultrasound diagnosis, which guarantees a considerable reduction in morbidity and mortality. The pathognomonic antenatal ultrasound signs found were the double fluid bubble image to describe duodenal atresia and the multiple fluid image for jejunoileal involvement. We report 06 cases of antenatal diagnosis of intestinal atresia with 66.67% duodenal and 33.33% jejuno-ileal at the end of the second trimester and in the third trimester of pregnancy. The aim of this work was to clarify the antenatal aspects of this nosological entity which are not sufficiently described on ultrasound.

Keywords

Antenatal Ultrasound, Intestinal Atresia, Bouake

1. Introduction

Intestinal atresia constitutes one of the serious congenital anomalies of the digestive tract, characterized by partial or total obstruction of the intestine, often detected in the antenatal period [1] and [2]. This anomaly, although relatively rare, is experiencing a marked increase in its incidence worldwide thanks to the new imaging tool for antenatal diagnosis, particularly ultrasound [3]. Antenatal ultrasound, due to its widespread availability and safety for the mother and fetus, has become an essential tool in the detection of fetal anomalies, including intestinal atresia. Ultimately, this review aims to highlight the crucial importance including

the effectiveness and reliability of antenatal ultrasound in the early detection of intestinal atresia, thus enabling proactive medical intervention and adequate care planning for these high-risk newborns.

The general objective of this case series was to describe the antenatal ultrasound aspects of intestinal atresia.

2. Methodology

We conducted a prospective, descriptive study spanning 36 months from January 2021 to December 2024. We collected 225 cases of antenatal fetal malformations, including 6 cases of atresia, from 10,500 obstetric ultrasounds performed. We used a Chison Qbit7 ultrasound system equipped with two linear and convex probes, ranging from 7.5 to 15 MHz and 3.5 to 5.5 MHz, respectively. This study was conducted in strict compliance with the ethics and scientific integrity of our institution, and, above all, after obtaining the free and informed consent of the participants.

3. Patients and Observations

We report six cases of intestinal atresia observed in the medical imaging and radiodiagnostic department of the Bouake University Hospital.

There are six pregnant women:

Case 1: 33-year-old pregnant woman, multiparous, with ancient history of induced abortion, admitted to the ultrasound unit for excessive uterine height. The obstetric ultrasound performed revealed a double fluid bubble image in the fetal abdomen associated with polyhydramnios without any other obvious fetal anomaly (Figure 1). It was a male fetus of 31 weeks of amenorrhea.

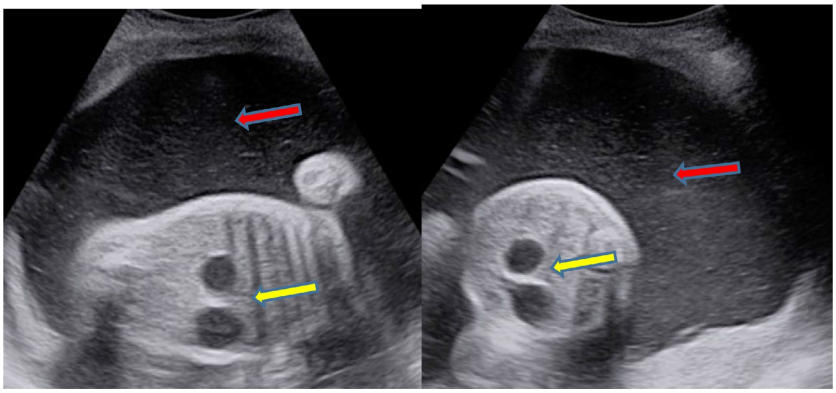


Figure 1. Ultrasound image of the fetal abdomen highlighting a double fluid bubble image (yellow arrow) with polyhydramnios (red arrow).

Case 2: 25-year-old pregnant woman, primigravida, seen in our department for her prenatal check-up. The ultrasound which was carried out revealed a multiple fluid image suggestive of jejunoileal atresia associated with polyhydramnios, fetal ascites and bi-ventricular hydrocephalus in a living fetus of 31 weeks + 05 days, gender female (Figure 2). This was the very first ultrasound since the start of this

pregnancy. At 35 weeks of gestation, the pregnant woman consulted for a lack of active fetal movements. And the ultrasound carried out revealed an overlapping of the skull bones, a disorganization of the thoraco-abdominal structures and a flat cardiac activity trace thus confirming intrauterine fetal death.

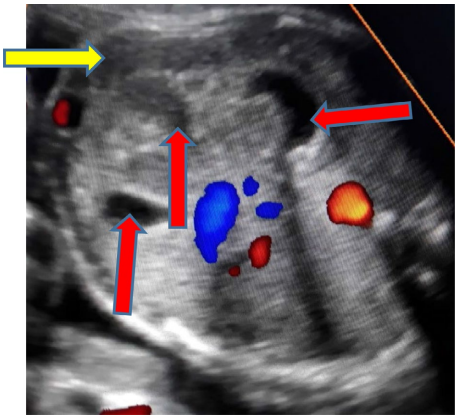


Figure 2. Ultrasound image of the fetal abdomen highlighting a triple fluid bubble image (red arrow) with fetal ascites (yellow arrow).

Case 3: This was a 31-year-old pregnant woman, second procedure and primiparous, with no particular history who had been received for her first obstetric ultrasound. A male fetus, 28 weeks 04 days old, was revealed by ultrasound. An image of a double bubble was noted in the fetal abdomen associated with moderate polyhydramnios (Figure 3).

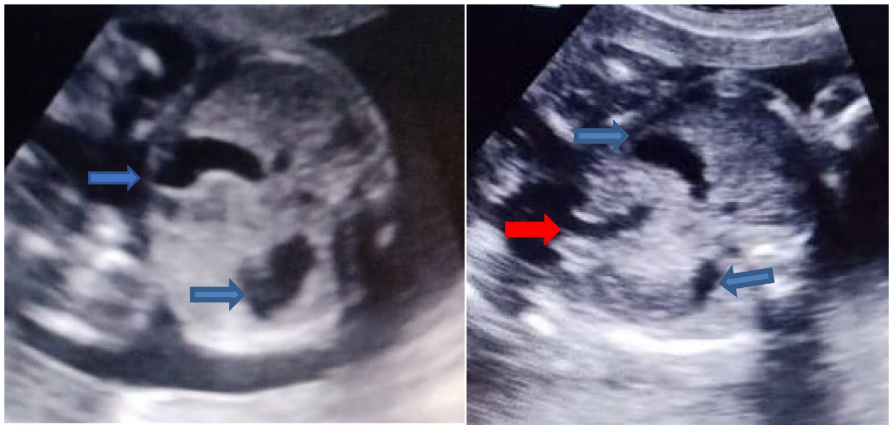


Figure 3. Ultrasound images of the fetal abdomen highlighting a double bubble image (blue arrow) with an umbilical vessel (red arrow).

Case 4: This was a 29-year-old pregnant woman, third procedure and second parity, who was received in our department for her first ultrasound concerning her prenatal check-up. The ultrasound showed a male fetus of 31 weeks 02 days. There was an image of more than two bubbles in the fetal abdomen, suggestive of intestinal atresia associated with moderate polyhydramnios (Figure 4(a)). On D2 of life, this infant presented with abdominal distension associated with uncontrol-

lable postprandial vomiting (Figure 4(b)). The parents took him to pediatric surgery where an indication for surgery was made after an unprepared abdominal X-ray (Figure 4(c)). Intraoperatively, it was ileal atresia.

Case 5: This was a 27-year-old pregnant woman, second procedure, primiparous, who was at her second obstetric ultrasound after the one carried out at 09 weeks 04 days of amenorrhea. The ultrasound showed a female fetus of 32 weeks 06 days. The polyhydramnios (Figure 5(a)) and a double fluid bubble image in the fetal abdomen (Figure 5(b) & Figure 5(c)), suggestive of duodenal atresia. On D2 of life this infant presented vomiting associated with abdominal distention. The X-ray of the abdomen without preparation made it possible to objectify a voluminous image of a gas bubble more suggestive of duodenal atresia (Figure 5(d)).

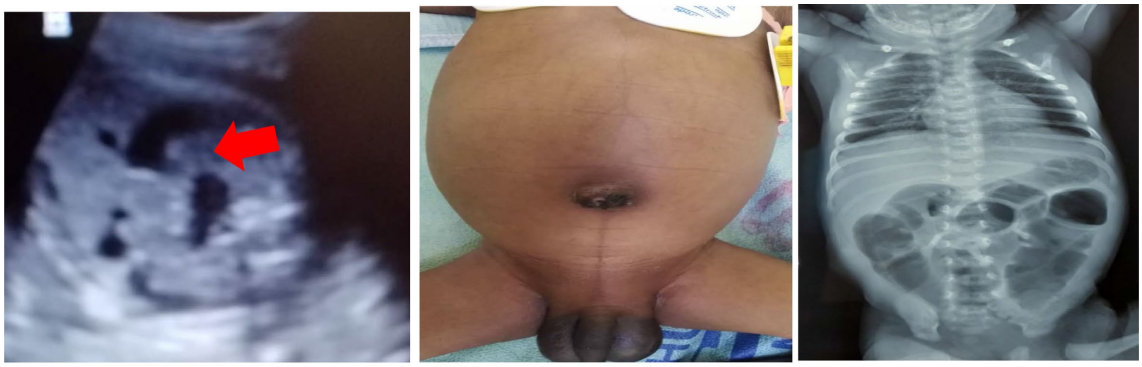


Figure 4. Ultrasound image of the fetal abdomen (a) highlighting a multiple fluid image (red arrow). Photo of the distended abdomen after birth (b) and plain abdominal x-ray image (c).

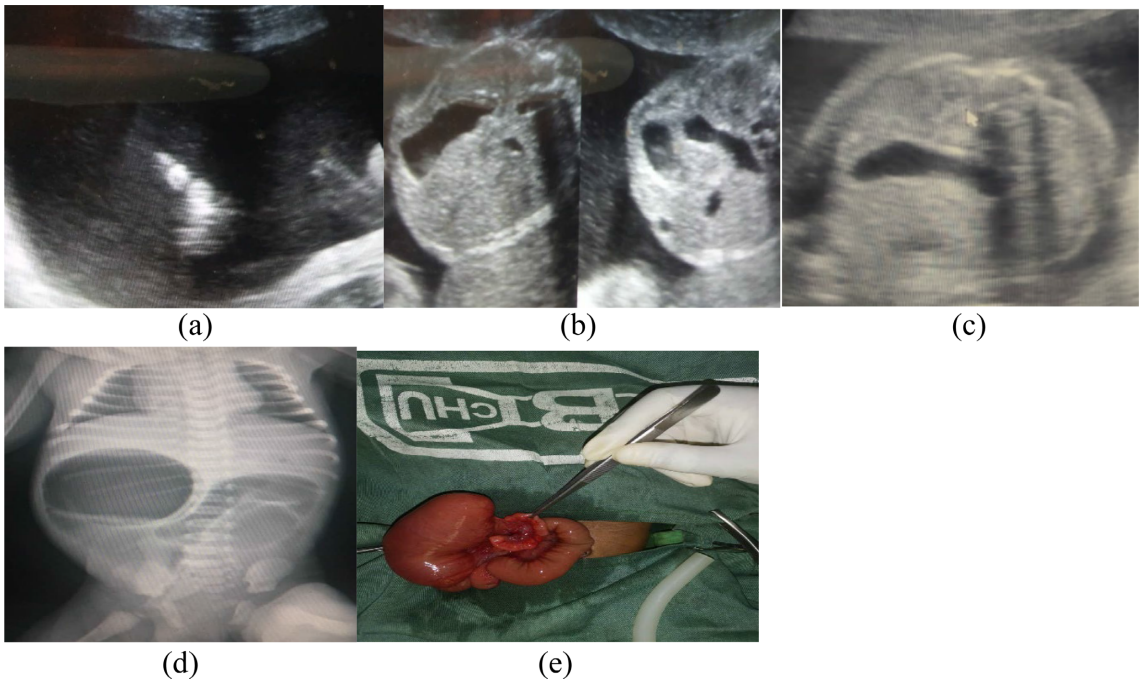
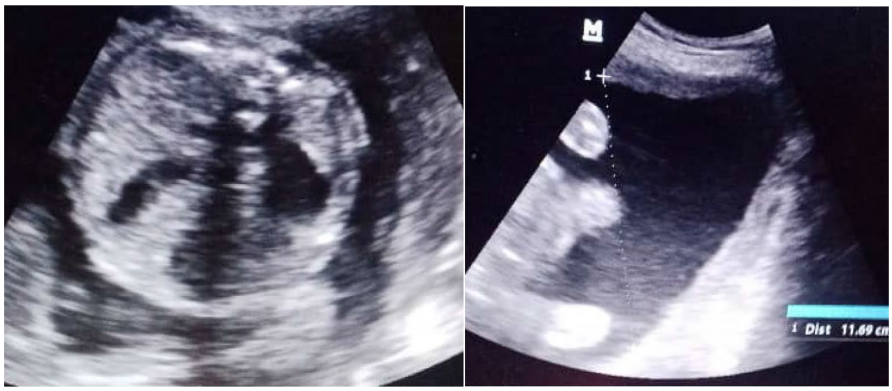


Figure 5. Ultrasound images (b), (c) of the fetal abdomen highlighting a double fluid bubble image with polyhydramnios (a) plain abdominal x-ray images of double gas bubble (d) and intraoperative duodenal stricture (e).

Intraoperatively it was also duodenal atresia (Figure 5(e)).

Case 6: This was a 38-year-old patient, 3rd procedure, 2nd parity, without specific ancient history, who was at her second obstetric ultrasound after the one carried out at 07 weeks 06 days of amenorrhea. The ultrasound showed a male fetus of 27 weeks 04 days. There was a double bubble image in the fetal abdomen suggestive of duodenal atresia, associated with polyhydramnios (Figure 6(a) & Figure 6(b)).



(a) (b)

Figure 6. Ultrasound images of the fetal abdomen (a) highlighting a double fluid bubble image with polyhydramnios (b).

4. Discussion

In our study, intestinal atresia had a prevalence of 0.06% and represented 2.67% of all fetal malformations diagnosed by ultrasound prenatally.

The incidence of intestinal atresia is variously reported by authors, especially for antenatal diagnosis [2]-[5]. Antenatal ultrasound has established itself as a fundamental tool in the detection of fetal anomalies, including intestinal atresia. In this chapter, we review the main results of our study regarding the effectiveness and reliability of antenatal ultrasound in the early diagnosis of this anomaly. The pathophysiology of this entity is still debated. The most likely hypothesis would be linked to early damage to the superior mesenteric artery, leading to ischemia and obliteration of the intestinal lumen [6].

The average age of mothers was 30.5 years with extremes of 25 and 38 years. Our results were similar to those of SARAH in Morocco [7] and AWANA in Cameroon [8] who reported 30 years and 27 years respectively as the age of the mother. Antenatal diagnosis was made in fetuses with a mean age of 30.66 weeks with extremes of 27 weeks and 35 weeks. Antenatal ultrasound diagnosis of atresia was generally made in the third trimester according to African authors [7]-[9]. The fetuses concerned were more male with 04 boys compared to 02 girls. This male predominance was observed by Moustapha in Niger [10] and also reported by several authors [11] [12].

In utero detection of intestinal obstructions using ultrasound varies depending on the site of the lesion: 52% duodenal, 40% jejunal-ileal and 29% colonic [13].

Antenatal detection of non-duodenal small bowel atresia is important in the management because it can influence the mode of delivery and transfer to pediatric surgical services [14]. During this series of cases, we totalized 04 cases of duodenal atresia or 66.67% and 02 cases of jejunoileal atresia (33.33%). We have not had any cases suggestive of colonic atresia. Among these observed cases, we had 02 births referred to the pediatric surgery department where surgical treatment was carried out with a favorable outcome; 01 stillborn and 03 lost to follow-up.

According to the authors, the antenatal ultrasound signs of intestinal atresia are defined as follows [15], namely: that jejunoileal atresia is suggested in the presence of multiple fluid images in the fetal abdominal cavity which are distended intestinal loops. The juxtaposition of echogenic fluid formations animated by peristaltic movements allows us to differentiate them from urinary collections. While the characteristic ultrasound appearance of duodenal atresia is in the form of a "double water bubble" image, associated with the transverse abdominal section, there is a significant fluid formation to the left of the midline corresponding to the distension of the stomach, and another less important one on the right corresponding to that of the duodenum. However, the diagnosis of colonic atresia remains difficult antenatally, unlike small bowel obstructions. Theoretically, there is no ultrasound indication of colonic atresia, since physiologically, the liquid constituting meconium is reabsorbed by the wall of the colon [16].

During our study, we observed these same ultrasound signs of intestinal atresia reported by the authors. These were double fluid bubble images for duodenal atresia and multiple fluid images for jejunoileal atresia. Polyhydramnios was associated with 05 cases or 83.33%. One case of fetal ascites was described, *i.e.*, 16.67%.

5. Conclusions

Intestinal atresia is an entity of fetal digestive anomalies, the most common cause of congenital small bowel obstruction and is generally associated with polyhydramnios. Prenatal diagnosis is important and possible by performing an ultrasound at the end of the second trimester or in the third trimester highlighting characteristic aspects.

The advantage of antenatal diagnosis of this pathology lies in the speed of surgical treatment in the immediate postnatal period given that it is an extreme emergency.

Authors' Contributions

All authors have contributed to the development of this study and declare to have read and approved this manuscript.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] PaedSurg Africa Research Collaboration (2021) Paediatric Surgical Outcomes in Sub-

Saharan Africa: A Multicentre, International, Prospective Cohort Study. *BMJ Global Health*, **6**, e004406. https://doi.org/10.1136/bmjgh-2020-004406

[2] Walker, K., Badawi, N., H Hamid, C., Vora, A., Halliday, R., Taylor, C., *et al.* (2008) A Population-Based Study of the Outcome after Small Bowel Atresia/Stenosis in New South Wales and the Australian Capital Territory, Australia, 1992-2003. *Journal of Pediatric Surgery*, **43**, 484-488. https://doi.org/10.1016/j.jpedsurg.2007.10.028

[3] Hemming, V. and Rankin, J. (2007) Small Intestinal Atresia in a Defined Population: Occurrence, Prenatal Diagnosis and Survival. *Prenatal Diagnosis*, **27**, 1205-1211. https://doi.org/10.1002/pd.1886

[4] Dhibou, H., Bassir, A., Sami, N., Boukhanni, L., Fakhir, B., Asmouki, H., *et al.* (2016) Atrésie intestinale iléale: Diagnostic anténatale et prise en charge. *Pan African Medical Journal*, **24**, Article 240. https://doi.org/10.11604/pamj.2016.24.240.9807

[5] Celli, J. (2014) Genetics of Gastrointestinal Atresias. *European Journal of Medical Genetics*, **57**, 424-439. https://doi.org/10.1016/j.ejmg.2014.06.007

[6] Walker, W.A., Dyrie, P.R., Hamilton, J.R., Walker-Smith, J.A. and Watkins, J.B. (1996) Pediatric Gastrointestinal Disease: Pathophysiology, Diagnosis, Management. W B Saunders Co.

[7] Sarah, S.I., Mehdi, L., Karam, M.S., Mamouni, N., Sanae, E., Bouchikhi, S. and Abdaziz, B. (2021) Duodenal Atresia from Antenatal Diagnosis to Surgical Management (Case Report). *International Journal of Academic Health and Medical Research*, **5**, 12-14.

[8] Awana, A.P., Néossi, N.M., Ndjitoyap, N.A., Nko'o, A.M. and Zeh, O.F. (2021) Antenatal Diagnosis of Jejunal Atresia during Ultrasound for Secondary Polyhydramnios. *Health Sciences & Diseases*, **22**, 119-120.

[9] Hanane, D., Ahlam, B., Nadia, S., Lahcen, B., Bouchra, F., Hamid, A., et al. (2016) Ileal Intestinal Atresia: Antenatal Diagnosis and Management. *Pan African Medical Journal*, **24**, 1-5.

[10] Moustapha, H., Ali Ada, M.O., Sidi Mansour, I.H., Samira, S., Issoufou, Y., Habou, O. and Intestinal, A.L. (2023) Atresia in Niger: Clinical Presentation, Treatment and Prognosis. *Health Sciences & Diseases*, **24**, 19-22.

[11] Eltayeb, A.A. (2009) Different Surgical Techniques in Management of Small Intestinal Atresia in High Risk Neonates. *Annals of Pediatric Surgery*, **5**, 31-35.

[12] Okuyama, H. (2016) Duodenal Atresia and Stenosis. In: Taguchi, T., Iwanaka, T. and Okamatsu, T., Eds., *Operative General Surgery in Neonates and Infants*, Springer, 193-198. https://doi.org/10.1007/978-4-431-55876-7_30

[13] John, R., D'Antonio, F., Khalil, A., Bradley, S. and Giuliani, S. (2015) Diagnostic Accuracy of Prenatal Ultrasound in Identifying Jejunal and Ileal Atresia. *Fetal Diagnosis and Therapy*, **38**, 142-146. https://doi.org/10.1159/000368603

[14] Virgone, C., D'Antonio, F., Khalil, A., Jonh, R., Manzoli, L. and Giuliani, S. (2015) Accuracy of Prenatal Ultrasound in Detecting Jejunal and Ileal Atresia: Systematic Review and Meta-analysis. *Ultrasound in Obstetrics & Gynecology*, **45**, 523-529. https://doi.org/10.1002/uog.14651

[15] Aloui Kasbi, N., Felah, S., Bellagha, I. and Hammou, A. (2004) La pathologie du tube digestif fœtal, apport de l'imagerie dans le diagnostic anténatal. *Archives de Pédiatrie*, **11**, 469-473. https://doi.org/10.1016/j.arcped.2003.11.014

[16] Anderson, N., Malpas, T. and Robertson, R. (1993) Prenatal Diagnosis of Colon Atresia. *Pediatric Radiology*, **23**, 63-64. https://doi.org/10.1007/bf02020229