Abstract

Background: The peri-operative management of omphalocoele in low- and middle-income countries is challenging owing to non-availability of neonatal intensive care units and equipment needed for the care of this anomaly. Aim: This study examined our experience in the management of omphalocoele and compared the pattern and outcome with a similar study from the same centre conducted four decades ago. Methods: A retrospective study of neonates managed for omphalocoele from 2003 to 2017 (Group A) was performed. Their demographic characteristics, clinical presentation, management modality and outcome were obtained and statistical analysis was performed to determine the predictors of mortality. The findings were also compared with the findings of a similar study (Group B) published from this centre four decades ago from 1973 to 1978. Results: A total of 95 patients were managed in Group A and 33 in Group B. Their ages ranged from 1 to 15 days with a median age of 1 day and a median gestational age at birth of 37 weeks (range – 36–43 weeks) in Group A and 5–72 h in Group B. There were 54 (56.8%) boys and 41 (43.2%) girls in Group A and 17 (51.5%) boys and 16 (48.5%) girls in Group B. Rupture of the sac was observed in 18 (18.9%) patients in Group A and 13 (39.4%) in Group B. Operative management was adopted for 55 (57.9%) patients in Group A compared to 14 (42.4%) in Group B. Mortality was recorded in 16 (16.8%) patients in Group A and 16 (48.5%) in Group B. Following further analysis in Group A, management outcome was noted to be significantly associated with the state of the sac ($P = 0.011$), presence of associated sepsis ($P = 0.002$) at presentation and management modality ($P = 0.048$) with only associated sepsis independently predicting mortality. Conclusion: Although epidemiological trend and clinical presentation are still similar, management outcome has improved over the years.

Keywords: Changing trends, management, middle-income country, mortality, omphalocoele, outcome, sepsis

Introduction

The appearance of anterior abdominal wall defects in the newborn is a source of psychological disturbance to the mother and this is particularly worse in a neonate with a major omphalocoele in which many of the abdominal viscera are visible through the covering membrane. Although the prevalence of omphalocoele in Africans is not known, it varies from 0.9 to 3.8 per 1000 births in Europe and America. There, however, appears to be an increase in the prevalence of omphalocoele in Asia, especially in Japan and Singapore. In spite of the grotesque appearance of the anterior abdominal wall in children with omphalocoele, they present late in most low- and middle-income countries (LMIC) when sepsis would have set in with consequent deterioration in their clinical state. Thus, the management of omphalocoele is challenging, especially in these countries, and this is often as a result of the reduced capacity of the abdomen which makes closure of the large defects to be difficult, presence of associated congenital malformations and lack of appropriate equipment with no dedicated neonatal intensive care unit (NICU) for post-operative care. Conversely, the management outcome has improved in high-income countries (HIC) while still poor in LMIC with overall mortality ranging from 30% to 45%. In view of some of the challenges (late presentation, lack of appropriate equipment and lack of dedicated NICU) and outcome highlighted above, this study presents our experience in the management of omphalocoele in a tertiary hospital of a middle-income country.

Address for correspondence: Dr. Olakayode Olaolu Ogundoyin, Department of Surgery, College of Medicine, University of Ibadan, Ibadan, Nigeria. E-mail: kayogundoyin@gmail.com

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms. For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

How to cite this article: Ogundoyin OO, Ajao AE. Changing trend in the management of omphalocoele in a tertiary hospital of a middle-income country. Afr J Paediatr Surg 2021;18:143-7.
omphalocoele and compares the pattern and outcome with a similar study from the same centre conducted four decades ago.

**Methods**

All neonates managed for omphalocoele over a 15-year period from January 2003 to December 2017 were retrospectively studied. Information about the demographic characteristics of the neonates, clinical presentation, the state of the covering sac (whether it was intact or ruptured), mode of management and outcome were extracted from the clinical records of these patients (Group A) and entered into a pro forma. Data from a publication on the second cohort of patients (Group B) managed for omphalocoele in the same hospital four decades ago from 1973 to 1978\(^{(13)}\) were obtained for comparison. Categorical variables were presented using frequency, proportions and ratios, while continuous variables were summarised using mean and standard deviation or median and interquartile range depending on their distribution. Chi-square and Fisher’s exact test analyses were used to test the association between categorical variables and mortality, while independent sample t-test or Mann–Whitney U test was used to compare continuous variables depending on their distribution. Multivariate logistic regression analysis was then performed to determine which of the statistically significant associated factors independently predicted mortality. Analysis of the data obtained was performed using Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL, USA) Version 23.0 Software with the level of significance set at \( P < 0.05 \). Ethical approval for the study was obtained from the University of Ibadan/University College Hospital Ethical Review Committee.

**Results**

A total of 95 neonates were managed during this period, their ages ranged from 1 to 15 days with a median age of 1 day and a median gestational age at birth of 37 weeks (range – 36–43 weeks). The mean age of their mothers was 27.9 ± 3.6 years. A total of 67 (70.5%) neonates were presented within the first 3 days of life. Of these, 44 (46.3%) neonates were presented within 24 h of life. The mean birth weight was 3.0 ± 0.5 kg, with a range of 2.2–4.1 kg, and the mean weight at presentation was 3.1 ± 0.5 kg. There were 54 (56.8%) boys and 41 (43.2%) girls (male-to-female ratio = 1:3:1). Only 10 (10.5%) patients had prenatal diagnosis of anterior abdominal wall defect and this was observed in patients who had antenatal care in our hospital. The diameter of the defects was >4 cm in 56 (59%) neonates and the mean diameter of the defects was 6.7 ± 3.0 cm with a range of 3–14 cm. Co-morbidities were observed in 21 (22.1%) patients, these comprised neonatal sepsis in 7 (7.4%), anaemia in 4 (4.2%), jaundice in 4 (4.2%), retroviral exposure in 2 (2.2%) and perinatal asphyxia and inguinal hernia in 1 (1.1%) neonate each. The covering sac was intact in 77 (81.1%) patients and ruptured in 18 (18.9%) patients. Associated congenital anomalies were observed in 14 (14.7%) which included Beckwith–Wiedemann Syndrome in 5 (5.3%) patients and polydactyly in 2 (2.1%) patients [Table 1]. Surgery was performed on 55 (57.9%) patients, 39 (41.0%) patients had non-operative management and only 1 (1.1%) patient refused any form of management and subsequently was discharged. Of the patients who had surgical management, 53 (55.8%) had primary closure of the defects (which include 39 [41%] patients whose defects were 4 cm and below and 14 [14.7%] whose defects were 4 cm–6 cm in diameter irrespective of the state of the covering membranes), whereas 2 (2.1%) had silo constructed to temporarily house the herniated viscera.

Post-operative complications were reported in 14 (14.7%) patients and these comprised wound-related complications in 12 (12.6%) patients (surgical site infection in 10 (10.5%) and burst abdomen and flap necrosis in 1 (1.1%) patient each) and haemorrhage and adhesive bowel obstruction in 1 (1.1%) patient each. Mortality was recorded in 16 (16.8%) patients; these included 9 (9.5%) patients with ruptured sac and 7 (7.4%) patients with intact sac, 2 (2.1%) patients with defects <4 cm and 14 (14.7%) patients with defects >4 cm (\( P = 0.707 \)).

The median length of hospital stay among the survivors was 18 days, with a range of 4–90 days. Patients with major omphalocoele were managed non-operatively with regular dressings using saline and 1% silver sulphadiazine cream and were discharged once the wound appeared clean, contracted and appeared manageable on an outpatient basis. Univariate analysis [Table 2] revealed that the management outcome was significantly associated with the state of the covering sac, whether intact or ruptured (\( P = 0.011 \)), the presence of associated sepsis (\( P = 0.002 \)) at presentation and the modality of management (\( P = 0.048 \)). Following multivariate analysis, only associated sepsis independently predicted mortality with more than five times as much risk of death [Table 3]. Mortality in patients with ruptured omphalocoele was four-and-a-half times as likely as those with intact membrane, but this was not statistically significant (\( P = 0.070 \)).

A total of 33 patients were managed within the 5 years in Group B. The age range of the patients was 5–72 h and the male-to-female ratio was 1:1. Rupture of the covering membrane was observed in 13 (39.4%) patients in Group B. The age range of the patients was 5–72 h and the male-to-female ratio was 1:1. Rupture of the covering membrane was observed in 13 (39.4%) patients in Group B.

### Table 1: Associated congenital anomalies

| Congenital anomalies          | Frequency (%) |
|-------------------------------|---------------|
| Beckwith-Wiedemann Syndrome   | 5 (35.72)     |
| Polydactyly                   | 2 (14.30)     |
| Malrotation of the intestine  | 1 (7.14)      |
| Intestinal atresia            | 1 (7.14)      |
| Patent urachus                | 1 (7.14)      |
| Undescended testis            | 1 (7.14)      |
| Hydrocele                     | 1 (7.14)      |
| Cleft lip and palate          | 1 (7.14)      |
| Lower midline association     | 1 (7.14)      |
| Total                         | 14 (100.00)   |
patients in Group B had associated anomalies, whereas 14 (14.7%) had in Group A. Non-operative management was used to manage omphalocoele on 19 (57.6%) patients in Group B and 39 (41.1%) in Group A; of these, non-operative management was adopted on all but 1 patient with intact covering membrane in Group B and 33 (34.7%) patients with intact membrane in Group A. Mortality was 48.5% in Group B and 16.8% in Group A [Table 4].

**Discussion**

The management of omphalocoele is challenging in LMIC. Indeed, it is daunting when the covering membrane is already ruptured before presentation with consequent high morbidity and mortality. [4,5] This may be worsened by late presentation as observed in this study, in which 29.5% of the patients were presented beyond the 3rd day of life up to 15 days. Early presentation and prevention of sepsis are key important aspects of successful management of patients with omphalocoele. The fact that many patients are often delivered at home following an unsupervised antenatal period and have to be transported to the hospital with dirty clothing that tends to contaminate the covering membrane or eviscerated organs makes the prognosis of their management to be poorer in the developing countries. [12,14-18] This is worsened by the lack of requisite facilities to support their perioperative management with consequent high morbidity and mortality rates as is the case in this country. [10] Although there are variations in the prevalence of omphalocoele by maternal age at delivery, [19-23] the mean maternal age in this study appears to be lower than in previous reports that stated that it is more common in mothers older than 40 years. [22-23]

In HIC, prenatal diagnosis, especially of major omphalocoele, [24,25] in utero transfer to the nearest paediatric surgical centre, assisted delivery to prevent rupture and contamination of the covering membrane and availability of NICU and other requisite facilities needed for primary peri-operative management of these patients have made the management outcomes to be very good. [16,26-29] It has been reported that only about two-third of cases of anterior abdominal wall defects are detected with prenatal ultrasound. Furthermore, the rate of false-positive reports and misdiagnoses of anterior abdominal wall defects is very high. These have been attributed to the technique of scanning, the quality of equipment and the experience of the sonologist. [30,31] The observed low rate of prenatal diagnosis of 10.5% in the present study compared to previous reports [30,31] may be attributed to the use of ultrasonographic machines with very poor resolution and the fact that majority of the sonologists might have been poorly trained in the use of ultrasonography in the peripheral centres. [30,31] This may also explain why the rate of prenatal diagnosis was lower than the reported rate from HIC. [30,31] although it is higher than the reported rate from another centre in this country. [8]

The size of the defect is a very strong factor to be considered in LMIC due to the presence of associated severe congenital anomalies, lack of appropriate equipment, lack of dedicated NICU for post-operative care and inadequate provision of safe anaesthesia. [10,32,33] Improvements in neonatal ventilation, peri-operative monitoring, nutrition and availability of synthetic materials like soft mesh [34-37] to achieve primary closure of omphalocoele with very large defects have also reduced the peri-operative morbidity and mortality in HIC. [27] Non-operative management of major omphalocoele with intact membranes or severe associated congenital malformations is still being practiced in LMICs, whereas primary fascial closure of small defects, staged closure using silos and conversion to incisional hernia (by closing the skin only over the defect) are adopted for the large defects and those with ruptured membranes. [16]

### Table 2: Factors associated with mortality

| Variable                      | Alive, n (%) | Dead, n (%) | P     |
|-------------------------------|--------------|-------------|-------|
| Sex                           |              |             |       |
| Male                          | 46 (85.2)    | 8 (14.8)    | 0.545 |
| Female                        | 33 (80.5)    | 8 (19.5)    |       |
| Age in years, median (IQR)    |              |             |       |
| <4 cm                         | 15 (88.2)    | 2 (11.8)    | 0.707 |
| ≥4 cm                         | 30 (78.9)    | 8 (21.1)    |       |
| Birth weight (kg)             |              |             |       |
| 3.0±0.9                       | 3.1±0.4      | 0.289       |       |
| Diameter of defect (n=55)     |              |             |       |
| <4 cm                         | 1 (2)        | 1 (2)       | 0.816 |
| ≥4 cm                         | 3 (1.6)      | 1 (2)       |       |
| State of membrane             |              |             |       |
| Intact                        | 68 (88.3)    | 9 (11.7)    | 0.011*|
| Ruptured                      | 11 (61.1)    | 7 (38.9)    |       |
| Associated sepsis (n=88)      |              |             |       |
| Yes                           | 23 (67.6)    | 11 (32.4)   | 0.002*|
| No                            | 50 (92.6)    | 4 (7.4)     |       |
| Source of referral (n=61)     |              |             |       |
| Rural                         | 8 (66.7)     | 4 (33.3)    | 0.263 |
| Urban                         | 40 (81.6)    | 9 (18.4)    |       |
| Management type (n=78)        |              |             |       |
| Non-operative                 | 16 (69.6)    | 7 (30.4)    | 0.048*|
| Operative                     | 49 (89.1)    | 6 (10.9)    |       |
| Mean maternal age (years) (SD)| 27±3.5       | 32.0±3.0    | 0.050 |

*Statistically significant at P<0.05. IQR: Interquartile range, SD: Standard deviation

### Table 3: Multivariate logistic regression analysis of factors predicting mortality in omphalocoele

| Variable                      | β   | Adjusted OR | 95% CI          | P     |
|-------------------------------|-----|-------------|-----------------|-------|
| Associated sepsis             |     |             |                 |       |
| Yes                           | 1.7 | 5.47        | 1.01-29.55      | 0.048*|
| No                            |     |             |                 |       |
| State of membrane             |     |             |                 |       |
| Ruptured membrane             |     |             |                 |       |
| Intact                        | 1.51| 4.52        | 0.88-23.20      | 0.070 |
| Type of management            |     |             |                 |       |
| Non-operative                 |     |             |                 |       |
| Operative                     | 1.44| 4.21        | 0.91-19.57      | 0.066 |

*Statistically significant at P<0.05. OR: Odd ratio, CI: Confidence Interval
Table 4: Comparison of present study with previous study from the same centre

| Parameters                  | Group A (current study) | Group B (Nwabueze-Ihekwaba) |
|-----------------------------|-------------------------|-----------------------------|
| Number of cases             | 95                      | 33                          |
| Study period (years)        | 15                      | 5                           |
| Age range                   | 1–15 days               | 5–72 h                      |
| Sex ratio (male:female)     | 1.3:1                   | 1:1                         |
| Type of omphalocele, n (%)  |                         |                             |
| Intact membrane             | 77 (81.1)               | 20 (60.6)                   |
| Ruptured membrane           | 18 (19.0)               | 13 (39.4)                   |
| Associated anomalies        | 14 (14.7)               | 16 (48.5)                   |
| Treatment, n (%)            |                         |                             |
| Non-operative               | 39 (41.1)               | 19 (57.6)                   |
| Operative                   | 55 (57.9)               | 14 (42.4)                   |
| Mortality                   | 16 (16.8)               | 16 (48.5)                   |

Expectedly, mortality was high in patients with ruptured sac (38.9%). In the present study, the management outcome was significantly related to whether the covering sac is ruptured or not, associated sepsis and the management modality adopted but only the presence of associated sepsis independently predicted mortality as suggested by multivariate analysis. A comparison of the findings in this study (Group A) with an earlier study carried out about four decades ago in this centre revealed a similar trend in the epidemiology and presentation of the anomaly. However, the number of patients with ruptured omphalocele was high in Group B in comparison to Group A. The fact that obstetric scan for prenatal diagnosis was not available in this environment four decades ago and an accompanying traumatic vaginal delivery of patients with large defects may account for this. Furthermore, recent improvements in perinatal services occasioned by proper training of traditional birth attendants to recognise high-risk pregnancies that can lead to traumatic deliveries and consequent rupture of the covering sac may explain the low incidence of ruptured omphalocele in Group A patients. However, there is a change in the trend of management of omphalocele as operative management was employed more on Group A patients than Group B patients. Operative management was adopted to manage all the ruptured cases and one patient with an intact membrane in Group B, whereas in Group A, operative management was adopted for all the patients except those with very large defects and associated severe congenital anomalies. Four decades ago, the specialty of paediatric surgery in the country was just being established and non-operative management was more favoured because of lack of trained paediatric anaesthetists, non-availability of NICU and lack of requisite equipment for peri-operative management of these neonates. These factors may also explain the reduction in the mortality rate observed in Group A patients.

The retrospective nature of this study poses a substantial limitation as the data were retrospectively collected. The data may leave out some variables due to inaccurate recording and mistakes in retrieving the records.

**Conclusion**

The epidemiology and presentation of omphalocele are still the same; however, there is a change in the trend of management with a gradual reduction in mortality rate with consequent improvement in the management outcome in our centre. The management outcome was significantly related to the state of the covering sac (whether it was intact or ruptured), associated sepsis and the management modality adopted but only the presence of associated sepsis independently predicted mortality. It is therefore recommended that further reduction in mortality rate may be achieved with early presentation and provision of appropriate equipment that can support the perioperative management of these neonates, especially the ones with ruptured omphalocele.

**Financial support and sponsorship**

Nil.

**Conflicts of interest**

There are no conflicts of interest.

**References**

1. Kemp J, Davenport M, Pernet A. Antenatally diagnosed surgical anomalies: The psychological effect of parental antenatal counseling. J Pediatr Surg 1998;33:1376-9.
2. Gong TT, Wu QJ, Chen YL, Jiang CZ, Li J, Li LL, et al. Evaluating the time trends in prevalence of exomphalos in 14 cities of Liaoning province, 2006 to 2015. Sci Rep 2016;6:1-8.
3. Saita S, Okamatsu T, Yamamoto T, Handa N, Nirasawa Y, Watanabe Y, et al. Changing profile of abdominal wall defects in Japan: results of a national survey. J Pediatr Surg 2000;35:66-71.
4. Tan KB, Tan KH, Chew SK, Yeo GS. Gastrochisis and omphalocele in Singapore: A ten-year series from 1993 to 2002. Singapore Med J 2008;49:31-6.
5. Wakhlu A, Wakhlu AK. The management of exomphalos. J Pediatr Surg 2000;35:73-6.
6. Osifo OD, Ovuene ME, Evbuomwan I. Omphalocele management using goal-oriented classification in African centre with limited resources. J Trop Pediatr 2011;57:286-8.
7. Charlesworth P, Ervine E, McCullagh M. Exomphalos major: The Northern Ireland experience. Pediatr Surg Int 2009;25:77-81.
8. Abdul-Rahman LO, Abdurahsheed NA, Adeniran JO. Challenges and outcomes of management of anterior abdominal wall defects in a Nigerian tertiary hospital. Afr J Paediatr Surg 2011;8:159-63.
9. Sowande OA, Adejujigbe O, Ogunrombi O, Usang UE, Bakare TI, Ajai OT, et al. Experience with exomphalos in a tertiary health center in Nigeria. Afr J Paediatr Surg 2007;4:56-60.
10. Ogundoyin OO. Neonatal surgery in sub Saharan Africa: Challenges and solutions. Afr J Med Med Sci 2017;46:399-405.
11. Murphy FL, Mialzan TA, Tarheen F, Corbally MT, Puri P. Gastrochisis and exomphalos in Ireland 1998-2004. Does antenatal diagnosis impact on outcome? Pediatr Surg Int 2007;23:1059-63.
12. Uba AF, Chirdan LB. Omphalocele and gastrochisis: Management in a developing country. Niger J Surg Res 2003;5:57-61.
13. Nwabueze-Ihekwaba F. Omphalocele: experience in the African tropics. Postgrad Med J 1981;57:635-9.
14. García H, Franco-Gutiérrez M, Chávez-Aguilar R, Villegas-Silva R, Xequé-Alamilla J. Morbidity and mortality in newborns with omphalocele and gastrochisis anterior abdominal wall defects. Gac Med Mex 2002;138:519-26.
15. Egwaikhide E, Osifo D, Evbuomwan I. Management of omphalocele major. Nig J Surg 2005;15:71-3.
16. Ameh EA, Chirdan LB. Ruptured exomphalos and gastroschisis: A retrospective analysis of morbidity and mortality in Nigerian children. Pediatr Surg Int 2000;16:23-5.
17. Imo AO, Okoye IJ, Okere P. Omphalocele in a neonate. West Afr J Radiol 2000;7:26-9.
18. Osifo OD, Efobi AC. Challenges of giant ventral hernia repair in children in an African tertiary care center with limited resources. Hernia 2009;13:143-7.
19. Anderson JE, Galganski LA, Cheng Y, Stark RA, Saadai P, Stephenson JT, et al. Epidemiology of gastroschisis: A population-based study in California from 1995 to 2012. J Pediatr Surg 2018;53:2399-403.
20. Kirby RS. The prevalence of selected major birth defects in the United States. Semin Perinatol 2017;41:338-44.
21. Kirby RS, Marshall J, Tanner JP, Salemi JL, Feldkamp ML, Marengo L, et al. Prevalence and correlates of gastroschisis in 15 states, 1995 to 2005. Obstet Gynecol 2013;122:275-81.
22. Stallings EB, Isenburg JL, Short TD, Heinke D, Kirby RS, Romitti PA, et al. Population-based birth defects data in the United States, 2012-2016: A focus on abdominal wall defects. Birth Defects Res 2019;111:1436-47.
23. Marshall J, Salemi JL, Tanner JP, Ramakrishnan R, Feldkamp ML, Marengo LK, et al. Prevalence, correlates, and outcomes of omphalocele in the United States, 1995-2005. Obstet Gynecol 2015;126:284-93.
24. Davidson JM, Johnson TR Jr., Rigdon DT, Thompson BH. Gastroschisis and omphalocele: Prenatal diagnosis and perinatal management. Prenat Diagn 1984;4:353-63.
25. Blazer S, Zimmer EZ, Gover A, Bronshtein M. Fetal omphalocele detected early in pregnancy: Associated anomalies and outcomes. Radiology 2004;232:191-5.
26. Novotny DA, Klein RL, Boeckman CR. Gastroschisis: An 18-year review. J Pediatr Surg 1993;28:650-2.
27. Filston HC. Gastroschisis—primary fascial closure. The goal for optimal management. Ann Surg 1983;197:260-4.
28. Schwartzberg SD, Pokorna WJ, McGill CW, Harberg FJ. Gastroschisis and omphalocele. Am J Surg 1982;144:650-4.
29. Stringel G, Filler RM. Prognostic factors in omphalocele and gastroschisis. J Pediatr Surg 1979;14:515-9.
30. Morrow RJ, Whittle MJ, McNay MB, Raine PA, Gibson AA, Crossley J. Prenatal diagnosis and management of anterior abdominal wall defects in the west of Scotland. Prenat Diagn 1993;13:111-5.
31. Emanuel PG, Garcia GL, Angtuaco TL. Prenatal detection of anterior abdominal wall defects with US. Radiographics 1995;15:517-30.
32. Ameh EA. Challenges of neonatal surgery in Sub-Saharan Africa. Afr J Paediatr Surg 2004;1:43-8.
33. Chirdan LB, Ngiloi PJ, Elhalaby EA. Neonatal surgery in Africa. Semin Pediatr Surg 2012;21:151-9.
34. El-Shafei E. Repair of congenital and acquired abdominal wall defects in infants using Proceed® surgical mesh. Ann Pediatr Surg 2009;15:46-51.
35. Erikson JR, Gögenur I, Rosenberg J. Choice of mesh for laparoscopic ventral hernia repair. Hernia 2007;11:481-92.
36. Burger JW, Halm JA, Wijsmuller AR, ten Raa S, Jeeckel J. Evaluation of new prosthetic meshes for ventral hernia repair. Surg Endosc 2006;20:1320-5.
37. Rosenberg J, Burcharth J. Feasibility and outcome after laparoscopic ventral hernia repair using Proceed mesh. Hernia 2008;12:453-6.
38. Talabi AO, Sowande OA, Adejuyigbe O. Challenges in the management of omphalocele in Ile-Ife, Nigeria. J Clin Neonatol 2020;9:280-5.
39. Sotiloye OS. Ultrasonography: Recommendations for its appropriate use in routine Antenatal Care in Nigeria. Postgraduate Training Course in Reproductive Health/Chronic Disease. Available from: https://www.gfmer.ch/Endo/Course2003/Ultrasound_antenatal_care_Nigeria.htm. [Last accessed on 2021 Feb 22].
40. Moretti M, Khoury A, Rodriguez J, Lobe T, Shaver D, Sibai B. The effect of mode of delivery on the perinatal outcome in fetuses with abdominal wall defects. Am J Obstet Gynecol 1990;163:833-8.
41. Linnaus ME, Donato B, McMahon L, Chambliss L, Notrica DM. A case of traumatic rupture of a giant omphalocele and liver injury associated with transverse lie and preterm labor. J Pediatr Surg Case Reports 2016;14:4-7.
42. Matthews MK, Walley RL, Ward A, Akpaidem M, Williams P, Umoh A. Training traditional birth attendants in Nigeria—The pictorial method. World Health Forum 1995;16:409-13.