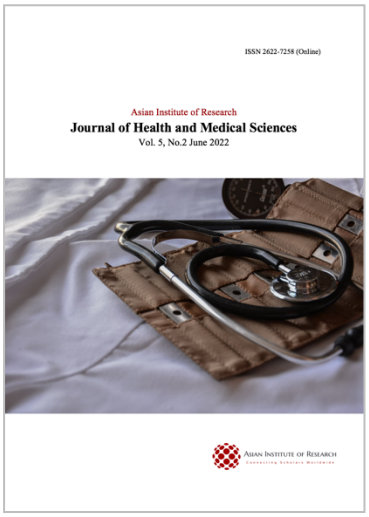

Journal of Health and Medical Sciences

Oloyede, O. A., Lamina, M. A., & Shorunmu, T. O. (2022), Optimizing Fetal Outcomes in Twin-Twin-Transfusion Syndrome using Serial Amnioreduction in Resource-Constrained Unit: A Case Report. *Journal of Health and Medical Sciences*, 5(2), 44-48.

ISSN 2622-7258

DOI: 10.31014/aior.1994.05.02.210

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The Asian Institute of Research
Journal of Health and Medical Sciences
Vol.5, No.2, 2022: 44-48
ISSN 2622-7258

DOI: 10.31014/aior.1994.05.02.210

Optimizing Fetal Outcomes in Twin-Twin-Transfusion Syndrome using Serial Amnioreduction in Resource-Constrained Unit: A Case Report

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Abstract
Background: Twin-twin transfusion syndrome is an important complication of monochorionic placentation in twin pregnancy. The management of this condition in Nigeria and many other developing countries has always been "watchful expectancy" with attendant high perinatal morbidity and mortality. Amnioreduction is a less demanding treatment option compared with fetoscopic laser coagulation management option in terms of cost and expertise, but has not been reported from any unit in Nigeria. Case Presentation: A 28-year-old gravid 2 para 1^{+0}, 1 alive, carrying twin pregnancy was referred at 22 weeks gestation with complaint of mild discomfort due to sudden rapid enlargement of the abdomen. Physical examination and ultrasound scan assessment confirm Quintero stage II Twin-twin transfusion syndrome and she underwent serial amnioreduction at 24, 28 and 31 weeks of gestation with satisfactory outcomes. She had caesarean section at 33 weeks due to an acute episode of severe maternal discomfort and was delivered of 2 live female babies. There were no adverse perinatal events. Conclusion: This case presented demonstrates the role of amnioreduction in the management of carefully selected cases of twin-twin transfusion syndrome and further encouraged its utilization. in resource-constrained units instead of 'watchful expectancy' and in the absence of fetoscopic laser photocoagulation

Keywords: Twin-to-Twin Transfusion Syndrome, Serial Amnioreduction, Fetoscopic Laser Photocoagulation, Quintero Staging, Resource-Constrained Unit

1. Introduction

Nigeria has the highest global rate of multiple pregnancies (Osaghae and Unuigbe, 2016). The management of Twin-twin transfusion syndrome (TTTS), which is one of the important complications and a significant contributor to the associated high perinatal morbidity and mortality has not been reported in literature. It is however reported that there is dearth of skill and expertise, equipment and other logistic requirements in Nigeria and other developing

countries that are required for the optimum management of cases (Osaghae and Unuigbe, 2016). Hence units practice conservative approach of 'watchful expectancy.'

Twin-twin transfusion syndrome was first described in 1975, and affects 8-15% of monochorionic diamniotic (MCDA) twin pregnancies, most of which present between 16-26 weeks of pregnancy (Simpson 2012, Xueju et al., 2015). In TTTS, the imbalance in the intertwin blood transfusion from donor fetus to the recipient fetus is characterized by unidirectional deep arteriovenous flow that dominates the protective bidirectional superficial anastomoses (Durbin 2011, Bansal et al., 2020). The overall perinatal mortality in untreated TTTS rises from 60-70% to 90-100% in pregnancies delivered before 26 weeks, while long term neurodevelopmental deficit occurs in 20-40% of surviving fetuses (Durbin 2011, Simpson 2012, Salomon and Ville 2018 Bansal et al., 2020). The Quintero staging system is mostly used in clinical management. It defines early stages (I and II) by ultrasound finding of discordance in bladder and amniotic fluid (AF) volumes, intermediate stage III by abnormal Doppler findings, and late stages (IV and V) as hydrops and fetal death. In addition however, the gestational age, and the available skill and facilities are the core determinants of treatment modality. The treatment modalities available for the management of TTTS range from conservative approach to the more advanced fetoscopic laser coagulation. Amnioreduction procedure provides opportunity to prolong the pregnancy and improving the fetal outcomes through iatrogenic withdrawal of amniotic fluid and lowering of intrauterine pressure (Osaghae and Unuigbe, 2016).

We report the successful management of stage II TTTS with serial amnioreduction in the unit, in order to encourage feto-maternal medicine centres and specialists in Nigeria and other developing countries to utilize this procedure in appropriate cases instead of the current practice of 'watchful expectancy.'

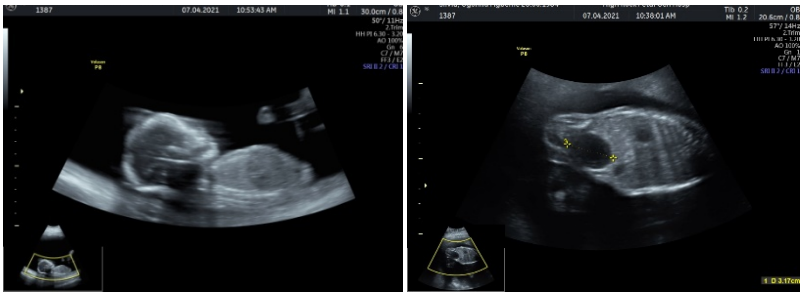
2. Case Report

A 27-year-old gravida 2 para 1^{+0}, 1 alive, with twin pregnancy was referred at 22 weeks with ultrasound scan diagnosis of increased AF in one fetus and reduced AF in the other fetus of a twin pregnancy. She also complained of an acute experience of rapidly enlarging abdomen, which was mildly discomforting. The initial mild abdominal discomfort however worsened progressively over 24 hours prior to admission at 24 weeks gestation. Physical examination reveals an apparently healthy pregnant woman, with no obvious signs of palor, anicteric, but has moderate to severe pretibial pedal edema. She was dyspnoeic in supine position and respiratory rate was 24 cycles per minute. The pulse rate and blood pressures were 78bpm and 136/78 mmHg respectively. The abdominal examination shows grossly enlarged and shinny abdomen, with symphysio-fundal height of 44cm. Multiple fetal parts were palpated and the fetal heart rates were faintly audible. Ultrasound scan assessment was carried out which demonstrated the main findings as poly-/oligohydramnios sequence and enlarged/collapsed bladder in fetuses I and II respectively (table 1 and figure 1).

Table 1: Ultrasound Scan Findings at Presentation based on Quintero Parameters

	Fetus I	**Fetus II**
AF (DVP)	Increased	Reduced
Fetal Bladder	Enlarged	Collapsed
UA PI	1.4 (Normal)	1.2 (Normal)
DV a-wave	Normal FVW	Normal FVW
EFW	543g	411g
Cervical Length: 27.8mm		

A: Increased/Reduced Amniotic Fluid



B: Collapsed Bladder Enlarged Bladder

Figure 1: Ultrasound Scans Diagnosis of Stage II TTTS

The ultrasound scan and clinical findings were discussed with her, and she consented to amnio-reduction which was carried out at 24, and repeated at 28 and 31 weeks due to recurrence of unbearable abdominal enlargement and maternal discomfort. Between 2500-3800mls of AF was aspirated under standard protocol during each procedure and follow up clinical monitoring and weekly ultrasound scan were done. Post-procedure, she continued on bed rest, oral indomethacin and salbutamol twice daily for 5 days, phenobarbitone for 3 days, and intravenous cefuroxime for 5 days. There was noticeable increased fetal activity, gradual increase in bladder, and amniotic fluid filling in twin II from the ultrasound scan report after the procedure. At 33 weeks of gestational, she had caesarean section due to acute and severe maternal discomfort and was delivered of two female babies with APGAR scores at 1 and 5 minutes respectively of 8 and 9 in baby I, and 7 and 9 in baby II. The babies weighed 2.1kg (baby I), and 1.6kg (baby II) (fig 2). There was no other remarkable post-operative event.

Baby I: 2.1Kg Baby II: 1.6Kg

Figure 2: Babies at delivery

3. Discussion

The fetal outcomes in TTTS can be substantially improved by early diagnosis and timely commencement of appropriate management modality (Sebir et al., 2010, Osaghae and Unuigbe, 2016). The possibility of early diagnosis through screening with markers such as the nuchal translucency (NT) scan, folding of the intertwin membrane and crown-rump length (CRL) is low in Nigeria and most developing countries, thus contributing to late diagnosis and poorer outcomes (Osaghae and Unuigbe, 2016). The diagnosis, in this case, was based on the Quintero staging which defines the severity and prognosis of the pathology, but reported to be a poor predictor of disease progression and weakly correlates stage with treatment outcomes (Mylrea-Foley et al., 2019, Couck et al.,

2021). The classification as stage II was based on the significant disparity in the AFV between fetus I and II, and the bladder volume measurements. The ultrasound diagnosis of stage II, gestational age of 24 weeks and rapidly worsening maternal discomfort were the basis for intervention, as recommended in pregnancies above 18 weeks (Prefumo and Jauniaux 2018, Mylrea-Foley et al., 2019). The choice of amnioreduction was based on the above considerations and the availability of expertise and equipment in the unit. The goal of the procedure was to reduce the intrauterine pressure (IUP), risk of preterm labour and improve the intraplacental blood circulation, through iatrogenic reduction in the amniotic fluid volume. The procedure was discontinued when deepest vertical pool of amniotic fluid (DVP AF) in the recipient twin was < 8cm. This skill for amnioreduction can be easily acquired through appropriate training, while the minimal equipment required is relatively cheap compared to other management modality especially FLP. The independent or adjunctive use of septostomy to equilibrate amniotic fluid volume, has not been shown to have better survival advantage over amnioreduction alone (Osaghae and Unuigbe, 2016). Moreover, it requires additional expertise for successful use. Fetoscopic laser coagulation which is the gold standard for all stages of TTTS, because it has better fetal survival and long-term neurological outcomes, was not used because of non-availability and expertise (Roberts et al., 2014, Prefumo and Jauniaux, 2018, Mylrea-Foley et al., 2019). Overall survival rate with serial amnioreduction is about 50% for at least one twin delivered at around 28 weeks, and the risk of sequelae is reduced to about 20% among survivors following amnioreduction.[6] She was delivered at 33 weeks, which is within previously reported 30-34 weeks when most pregnancies are delivered, usually due to severe maternal discomfort (Mylrea-Foley et al., 2019). There was no adverse perinatal event in both babies, and long-term follow up strategy is on-going.

4. Conclusion

The perinatal outcomes of TTTS presenting in resource-constrained units in Nigeria and other developing countries could be improved using serial amnioreduction in appropriate cases as demonstrated in this case. The acquisition of proficiency in procedure can be obtained through collaborations with fetal medicine centres experienced in the procedure.

Acknowledgment:
Appreciations to the patient for providing written consent to use images of babies

Funding:
Nil funding was required

Conflict of Interest:
None to declare

Ethical Approval:
Obtained from the institutional ethics committee

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