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**Cervical Incompetence and Outcomes of Management at A Secondary Health Facility in Nigeria**

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**Background:** Cervical incompetence (CI) is a common cause of recurrent mid-trimester pregnancy loss and preterm deliveries. Incompetence of the cervix is associated with fetal loss, perinatal morbidity and mortality; psychological and social stress for the affected woman. **Objective:** To describe the clinical presentation, management of cervical incompetence and outcomes of pregnancy at a secondary healthcare facility. **Materials and Methods:** A retrospective review conducted at Adeoyo Maternity Hospital among pregnant women who had cervical cerclage for treatment of cervical incompetence over a five-year period. There were 50 cases of cervical incompetence and medical records of 45 women treated by cervical cerclage were reviewed. The data collected included- socio-demographic, obstetric and clinical characteristics; and management. Data was analysed using IBM SPSS software version 23 and level of significance was p=<0.05. **Result:** Total number of deliveries over the five-year period was 12,845 and 50 women had cervical incompetence and cerclage, giving a CI prevalence of 0.39%. Mean age was 32.16± 4.35years, majority 33(73.3%) had < 3 miscarriages. Mean gestational age (GA) at presentation was 12.4 ± 3.54 weeks and at insertion of cervical stitch was at 14.7± 1.14 weeks. Mc Donald cervical cerclage was done; 41(91.1%) and 4(8.9%) had elective and emergency cerclage respectively. Overall, 34 (75.6%) had successful vaginal delivery of live babies; mean GA at delivery was 34.4±6.67weeks. Removal of cerclage-to-delivery interval was 1.0±1.23weeks. The fetal salvage rate was 71.1%. **Conclusion:** Cervical cerclage for CI is beneficial in the prevention of fetal wastage and gives hope to women with cervical incompetence. CI, pregnancy loss and preterm delivery are associated with psychosocial effects especially in environments where much premium is placed on child bearing. Early identification and management of CI is important to prevent pregnancy loss and complications.

**Keywords:** Pregnancy Outcome cerclage, cervical incompetence pregnancy, cervical cerclage, Pregnancy Outcome cervical incompetence.

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**Introduction**

Recurrent pregnancy loss is associated with disappointment and negative emotions for the affected woman. Cervical incompetence (CI) is a known and

common cause of recurrent mid-trimester pregnancy loss, preterm labour and delivery in the third trimester of pregnancy.1 It is the inability of the cervix to support or sustain a pregnancy to term due to structural or functional abnormality or defect.

The true incidence is unknown; an incidence of 0.05% to 1% of all pregnancies has been reported.2  CI may be congenital resulting from collagen deficiency, increased collagen lysis, mullerian duct defects and intrauterine exposure to Diethylstilbestrol leading to cervical weakness. Or acquired, resulting from trauma caused by cervical laceration during vaginal delivery or gynecological procedures such as forceful dilatation of the cervix, cervical amputation during Manchester repair, cone biopsy and large loop excision in the treatment of premalignant lesions of the cervix.1

CI presents as recurrent mid-trimester pregnancy loss in the form of painless cervical dilatation with or without drainage of liquor; followed by expulsion of the products of conception. 1 With consecutive pregnancies, there is a progressive decrease in the GA at which the miscarriage occurs. Cervical incompetence may also present as preterm labour usually preceded by preterm rupture of membrane (PROM).3 Preterm births are associated with increased neonatal morbidity and mortality3 and huge burden on the healthcare; economic and social impact on the affected family. It is associated with psychological and emotional disturbance to the parents due to the need for intensive neonatal care often for weeks, continuing support necessary after discharge from the hospital and delayed developmental milestone.3 Morbidities such as respiratory distress syndrome, necrotizing g enterocolitis, neonatal sepsis and long-term complications such as impairment in motor, behavioural and academic functions are associated with preterm infants.3 Therefore, prevention of preterm birth is essential for positive perinatal outcome.4

In the management of CI, cervical cerclage procedures are the standard treatment.5 This involves insertion of a prophylactic cervical stitch on the pregnant cervix; which provides a mechanical strength and acts as a barrier to ascending infection.6 Cervical cerclage procedures were described by Schirodkar in 1955 and Mc Donald in 1957.7,8 It is inserted when clinical history suggests mid trimester losses, evidence of cervical shortening on ultrasound, a painless dilatation of cervix in second trimester of pregnancy with or without membranes bulging.9 The usefulness of this procedure has been questioned because there are no randomized control trial to prove its efficacy, however many studies have shown improved outcome in well selected women.10,11,12 Osemwenkha et al reported a 94.4% fetal salvage in presence of cervical cerclage compared to 23.7% without cervical cerclage.4 This study evaluates the outcome of cervical incompetence in pregnancy following cerclage in a low-resource secondary health facility.

**Materials And Methods**

This was a retrospective review of pregnant women with cervical incompetence who had cervical cerclage done at Adeoyo Maternity Hospital (AMH) – a secondary level maternal and child healthcare facility over a 5-year period.

All pregnant women managed for cervical incompetence were included in the study.

The participants’ clinical details were obtained from the medical case records and operative records using a structured proforma. The information extracted includes the sociodemographic and obstetric characteristics, identifiable risk factors for cervical incompetence, clinical characteristics and examination findings at surgery; and the outcome of cervical cerclage and pregnancy. The pregnancy outcome was categorized as miscarriage, still birth and live birth. The mode of delivery was recorded either as vaginal delivery or caesarean section.

Data was collected was analysed using IBM Statistical Products and Service Solutions software version 23. Descriptive analysis was done using means (standard deviation) for continuous variable; frequencies and percentages for categorical variables. Chi-square test was used to test associations. The level of significance was set at p<0.05.

Ethical approval was obtained from the Oyo State Ethical Review committee. Ethical approval number – AD13/479/1611.

**Results**

A total of 50 women had CI and cerclage inserted during the five years period under review; the total delivery during the study period was 12,845. The prevalence of cervical incompetence in this study is 0.39%. Of the 50 women with CI, medical records were available for 45 patients. All 45 patients were reviewed and analysed. The mean age of the participants was 32.16 (± 4.35) years.

Table 1: Socio-demographic Characteristics of Patients

|  |  |  |
| --- | --- | --- |
| Variables | Frequency (N=45) | Percentage |
| Mean Age ± S.D (years)  Age (years) | 32.16 ± 4.35 | |
| 15-25 | 1 | 2.2 |
| 26-35 | 33 | 73.3 |
| >35 | 11 | 24.4 |
| Occupation |  |  |
| Employed | 17 | 37.8 |
| Self-employed | 23 | 51.1 |
| Unemployed | 5 | 11.1 |
| Level of education |  |  |
| Primary | 2 | 4.4 |
| Secondary | 22 | 48.9 |
| Tertiary | 21 | 46.7 |
| Marital status |  |  |
| Married | 44 | 97.8 |
| Separated | 1 | 2.2 |

Majority (73.3%) of the women were within the age range of 26-35 years; (51.1%) of the women were self-employed. Many of the women had secondary education and (97.8%) were married.

In Table 2, most women had <2 (64.4%) deliveries, majority (73.3%) had ≤3 number of miscarriages while 20% had up to 4-6 number of miscarriages and 6.7% had >6 miscarriages. 80% of the patients had no previous cervical surgery. The mean gestational age (GA) at presentation was 12.4±3.54weeks while mean GA at insertion was 14.7±1.14weeks. Majority of the respondent 41(91.2%) had insertion of cerclage at gestational age between 14 and 16 weeks

Table 2: Obstetric history of the patients

|  |  |  |
| --- | --- | --- |
| Obstetric History | Frequency | % |
| Number of deliveries |  |  |
| <2 | 29 | 64.4 |
| 2-4 | 16 | 35.6 |
| Number of miscarriages |  |  |
| ≤3 | 33 | 73.3 |
| 4-6 | 9 | 20.0 |
| >6 | 3 | 6.7 |
| Number of living children |  |  |
| ≤2 | 40 | 88.9 |
| >2 | 5 | 11.1 |
| Previous Cervical surgery |  |  |
| Yes | 9 | 20.0 |
| No | 36 | 80.0 |
| Mean GA at presentation ±SD (weeks) | 12.4±3.54 |  |
| Mean GA at insertion of cerclage ±SD (weeks) | 14.7±1.14 |  |
| GA at insertion of cerclage (weeks)  14-16 | 41 | 91.2 |
| 17-18 | 4 | 8.8 |

Table 3: Identifiable risk factors for cervical incompetence in the patients

|  |  |  |
| --- | --- | --- |
| Variables | Frequency | Percentage |
| Previous cervical laceration |  |  |
| Yes | 2 | 4.4 |
| No | 43 | 95.6 |
| Previous history of cerclage |  |  |
| Yes | 17 | 37.8 |
| No | 28 | 62.2 |
| Previous manual vacuum aspiration |  |  |
| Yes | 15 | 33.3 |
| No | 30 | 66.7 |
| Previous cervical dilation |  |  |
| Yes | 4 | 8.9 |
| No | 41 | 91.1 |
| Previous Gynaecologic surgery |  |  |
| Yes | 2 | 4.4 |
| No | 43 | 95.6 |

Table 3 shows 95.6% and 62.2% of women had no previous cervical laceration and history of cerclage. Likewise, 66.7%, 84.4% and 95.6% of the patients had no previous manual vacuum aspiration, vaginal instrumentation and gynaecologic surgery respectively. 91.1% of the women had no previous cervical dilation.

On examination 8(17.8%) of women had abnormal vaginal discharge; 28 (62.2%) had closed cervical os while 17 (37.8%) had open cervical os; 9 (20.0%) patients had defects of the cervix with anterior lip defect in 5 (61.2%) and posterior lip defect in 4 (8.8%). 31 (68.9%) women had vagina fornices that were delineable while 14 (31.1%) had no delineable/flushed vaginal fornices.

In table 5, majority of the cerclage 33(73.3%) was done by consultants and 43(95.6%) had no complication. Tocolytics with calcium channel blocker was used in 25 (55.6%) patients and ß-Agonist (4.4%). Duration of admission was mostly less than a week 28 (62.2%) while 17 (37.8%) spent more than a week. The reasons for admission included; bed rest, high blood pressure, emergency cerclage, intermittent contractions, previous pregnancy loss, twin gestation and patient request.

Table 4: Examination findings at cervical cerclage surgery

|  |  |  |
| --- | --- | --- |
| Variables | Frequency | % |
| Vaginal discharge |  |  |
| Abnormal | 8 | 17.8 |
| Normal | 37 | 82.2 |
| Cervical os on examination |  |  |
| Open | 17 | 37.8 |
| Closed | 28 | 62.2 |
| Defect of the cervix |  |  |
| Yes | 9 | 20.0 |
| No | 36 | 80.0 |
| Location of defect on cervix |  |  |
| Anterior Lip | 5 | 61.2 |
| Posterior Lip | 4 | 8.8 |
| Vaginal fornices |  |  |
| Delineable | 31 | 68.9 |
| Not delineable/flushed | 14 | 31.1 |
| Cervical excitation tenderness |  |  |
| Yes | 6 | 13.3 |
| No | 39 | 86.7 |

Table 6 reveals that majority of the patients 44 (97.8%) had cerclage removal. The GA at removal of cerclage showed that 23 (51.1%) patients had their cerclage removed at <37 weeks while 22 (48.9%) patients had their cerclage removed at ≥37 weeks. The mean removal to delivery interval was 1.0±1.56 week, with 25 (55.6%) having removal to delivery interval in less than aweek. The mean GA when labour was diagnosed was 35.7±5.50 weeks and 17 (28.9%) patients had premature rupture of membrane. Many of the patients 34 (75.6%) had vaginal delivery while 11 (24.4%) had caesarean sections.

Table 5: Perioperative history

|  |  |  |
| --- | --- | --- |
| Variables | Frequency | Percentage |
| Level of surgeon |  |  |
| Consultant | 33 | 73.3 |
| Resident | 12 | 26.7 |
| Timing of surgery |  |  |
| Elective | 41 | 91.1 |
| Emergency | 4 | 8.8 |
| Complications |  |  |
| Yes | 2 | 4.4 |
| No | 43 | 95.6 |
| Use of Tocolytics |  |  |
| Yes | 27 | 60.0 |
| No | 18 | 40.0 |
| Types of Tocolytics |  |  |
| Calcium blockers | 25 | 55.6 |
| B-agonist | 2 | 4.4 |
| None | 18 | 40.0 |
| Duration of admission (weeks) |  |  |
| ≤1 | 28 | 62.2 |
| >1 | 17 | 37.8 |

The mean gestational age at delivery was at 34.4±6.67weeks. Of the women 32 (71.1%) had live babies and the average birth weight of the babies was 2.9±0.5kg with 25 (78.1%) babies having weights ≥2.5kg and 7(21.9%) having weights <2.5kg. Majority 27 (84.4%) of the newborns had APGAR scores ≥7 while 5 (15.6%) had APGAR scores <7 at 1 minute. The Apgar score at 5 minutes showed that all the live babies had scores ≥7. Only 2 (4.4%) newborns were admitted into the Special Care Baby Unit (SCBU) for neonatal jaundice.

**Discussion**

This study evaluated the clinical presentation and outcomes of pregnancy in women with cervical incompetence over a five-year period at a secondary health facility in southwest Nigeria.

The main findings show a prevalence of cervical incompetence of 0.39%, majority of the pregnant women were aged 26-35 years and majority has had equal to or less than three pregnancy losses. There was reduction in previable pregnancy losses with increased fetal salvage rate following cerclage for cervical incompetence in this cohort of pregnant women.

The prevalence of cervical incompetence in pregnancy from this review was 0.39%. This is lower than a prevalence of 0.85% reported by Adeniran et al in 201013 at a tertiary centre. The lower prevalence may be due to the fact that tertiary centers are referral hospitals for high-risk patients such as patients with cervical incompetence for prompt intervention. The incidence of cervical incompetence documented by other studies ranged between 0.05-1%.2,4 The incidence of CI varies with population studied, study site and the mode of diagnosis.

In this study, risk factors such as cervical laceration, previous vaginal instrumentation, previous gynaecologic surgeries, and previous history of cervical cerclage were identified.

Table 6: Outcome of Cervical Cerclage

|  |  |  |
| --- | --- | --- |
| Variables | Frequency | Percentage |
| Removal of cerclage |  |  |
| Yes | 44 | 97.8 |
| No | 1 | 2.2 |
| GA at removal of cerclage (weeks) |  |  |
| <37 | 23 | 51.1 |
| ≥37 | 22 | 48.9 |
| Commencement of labour |  |  |
| Yes | 15 | 33.3 |
| No | 30 | 66.7 |
| Onset of labour  Mean gestational age ±S.D (weeks) | 35.7±5.50 |  |
| Premature rupture membrane |  |  |
| Yes | 13 | 28.9 |
| No | 32 | 71.1 |
| Mode of delivery |  |  |
| Vaginal delivery | 34 | 75.6 |
| Caesarean section | 11 | 24.4 |
| Mean Gestational Age at delivery ±S.D (weeks) = | 34.4±6.67 |  |
| Gestational Age at delivery  <37 | 17 | 37.8 |
| ≥37 | 28 | 62.2 |
| Outcome of Pregnancy |  |  |
| Miscarriage | 10 | 22.2 |
| Stillbirth | 3 | 6.7 |
| Live | 32 | 71.1 |
| Sex of baby |  |  |
| Male | 16 | 35.6 |
| Female | 19 | 42.2 |
| Removal to delivery interval (weeks) Mean ±S.D= 1.0±1.56 |  |  |
| <1 | 25 | 55.6 |
| 1-2 | 11 | 24.4 |
| 3-4 | 8 | 17.8 |
| >4 | 1 | 2.2 |
| Birth weight (kg) Mean ±S.D= 2.9±0.50 |  |  |
| <2.5 | 7 | 21.9 |
| ≥2.5 | 25 | 78.1 |
| Apgar score @ 1min |  |  |
| <7 | 5 | 15.6 |
| ≥7 | 27 | 84.4 |
| Apgar score @ 5min |  |  |
| ≥7 | 32 | 71.1 |
| Admission into SCBU |  |  |
| Yes | 2 | 4.4 |
| No | 43 | 95.6 |

Majority of the pregnant women have less than or equal to 3 recurrent spontaneous miscarriages. This is similar to findings by Osenwenkha et al and Okunsanya et al .4,10 The patients identified with history/evaluation suggestive of CI at previous miscarriages were counselled about findings and clinical features suggestive of CI, its implication, available treatment and options of management in subsequent pregnancies. Patients are no longer allowed to experience 3 recurrent miscarriages to make a diagnosis or confirmation of cervical incompetence. Furthermore, incidental finding of shortening cervical length or pre-viable dilatation of cervical internal os on routine pelvic scan are pointer to cervical incompetence.

Prompt identification and elective insertion of cervical stitch using a Merselene tape through various routes and techniques have been found beneficial in the management of cervical incompetence and prevention of fetal wastage. The use of either vaginal approach via McDonald or Schirodkar technique or abdominal approach via open abdominal or laparoscopic technique is employed.7, 8, 14, 15

In this study, majority of the cerclage procedures were elective. Emergency was done in about one tenth of the patient. This observation may explain the success documented in this study as emergency cerclage is associated with high rate of complication and poor outcome.16,17

In this study, majority of the pregnant women delivered within one week of cerclage removal with a mean removal to delivery interval of 1.0±1.23week. This is comparable with what was reported in Maiduguri in a study carried out by Bukar et al on pregnancy outcome and interval to delivery after cervical cerclage in which the mean cerclage removal to delivery interval was 9.3 days.11 Moreover, Alabi – Isama L et al found a median interval of removal to delivery of 14 days.18 This may be due to differences in the indication for the cerclage as labour was more likely to commence spontaneously in patients with ultrasound indicated cerclage as compared to those with history indicated cerclage.

Live birth occurred in majority of the women. The role of cervical cerclage in fetal salvage in cervical incompetence is demonstrated in this study with a fetal salvage rate of 71.1%. Several studies have documented favorable fetal outcomes. Fetal salvage rate of 76.3% by Bukar et al in Maiduguri, 79.7% by Osenwenkha in Benin, 85.4% by Muhammad et al in Jos, 89.5% by Adeniran et al in Ilorin, 92.2% by Feyi Waboso et al, 99.4% by Wright et al.4,11,12,13,16

Failed cerclage presenting as previable pregnancy loss occurred in less than a quarter of the pregnant women who had cervical cerclage for cervical incompetence. Cervical cerclage failure rate in this study was 22.0%.This is less than the findings by Osenwenkha et al with cerclage failure rate of 25.2%.4

Cervical cerclage continues to prevent previable pregnancy loss and preterm deliveries which are known contributors to prematurity, perinatal morbidity and mortality. Furthermore, perinatal morbidity and mortality is an important health index for the state of our health care system. Perinatal morbidity and mortality due to cervical incompetence is highly preventable; prompt intervention should be offered to women with recurrent pregnancy loss or women with painless cervical dilatation on both elective and emergency bases.

Limitation of this study: This was a retrospective study and there were limited ancillary modes of diagnosis at our facility.

**Conclusion**

In conclusion, CI with consequent previable pregnancy loss and preterm delivery is associated with psychosocial effect especially in our environment where premium is placed on child bearing. It is more traumatic for a woman to know that she is not infertile (fecundability) but challenged by being unable to carry pregnancy to term (fecundity). Patients with CI should be promptly identified to allow for elective insertion of cervical stitch in order to yield favourable fetal outcome.

*Declaration of Conflicts of Interest***:** The authors have no conflicts of interest.

*Funding Statement:* Self-sponsored

*Submission Declaration:*This work has not been published previously in any journal or in any other form.

*Ethical approval:* This study was approved by the institutional ethics Review Committee of Oyo State Ministry of Health, Department of planning, research and statistics. Ethical approval number - AD 13/479/1611.

**References**

1. Nkyekyer k. Cervical Incompetence In: Kwawukume EY, Ekele BA, Danso KA, Emuveyan EE (eds). Comprehensive Obstetrics in the Tropics.2nd edn Assemblies of God Literature Centre Ltd Accra. 2015.p415-21.
2. Srinivasan M, Krishanan RN, Lindow SW. Pregnancy Outcome Following Emergency Cervical Cerclage. Open Journal of Obstetrics and Gynecology. 2011; 1:184-6.
3. Moreira RS, Magalhaes LC, Alves CR. Effect of preterm birth on motor development, behavior and school performance of school age children: a systematic Review J Paediatr. 2014; 90(2):119-34.
4. Osemwenkha AP, Osaikhuwuomwan JA. Cervical cerclage in a Nigerian tertiary hospital: A review. Niger J Surg Sci 2014; 24:1-6
5. Ojabo A. Adesiyun, A, Hembah-Hilekaan S, Mohammed-Durosinlorun, A, Sulayman-Umar H. Pregnancy Outcomes Following Emergency Cervical Cerclage. Open Access Lib Journ .2014; 1-5.
6. Simcox R, Shennan A. Cervical cerclage: A review. Int J Surg. 2007; 5:205-9.
7. Shirodkar VN. A new method of operative treatment for habitual abortion in the second trimester of pregnancy. Antiseptic.1955; 52:299.
8. McDonald IA. Suture of the cervix for inevitable miscarriage. J Obstet Gynecol Br Emp.1957; 62(3):346-50.
9. Sandhu KS, Keeler S, Seubert DE. Cervical Insufficiency. In: Progress in Obstetrics and Gynaecology. John Studd, Seang Lin Tan, Frank Chervenak (Eds). London, Elsevier Publishers. 2008; 175-84.
10. Okunsanya B, Isabu Pa. Outcome of pregnancy with history indicated cervical cerclage insertion in a low-resource setting. J Matern Fetal Neonatal Med. 2014;28(3):13-68
11. Bukar M, Mohammed H, Ibrahim SM, Moruppa JY, Buba AA, Bakari MA. A 5year review of pregnancy outcome and interval to delivery after cervical cerclage in north-eastern Nigeria. Int J Med Biomed Res. 2014; 3(1):17- 21
12. Feyi-waboso PA, Umezurike CC. Management of cervical incompetence in Aba, South-Easthern Nigeria. Niger J Med. 2005; 14:400-4.
13. Adeniran AS, Aboyeji AP, Okpara EU, Fawole AA, Adesina KT. Pregnancy outcome in cervical incompetence: Comparison of before and after intervention. 2014; 31(1): 311-14.
14. Shin JE, Kim MJ, Kim GW, Lee DW, Lee MK, Kim SJ, et al. Laparoscopic transabdominal cervical cerclage: Case report of a woman without ectocervix at 11 weeks’ gestation. Obstet Gynecol Sci 2014; 57:232-5.
15. Egbaname Aigere SO, Egagifo O, Igberase GO. Live birth following abdominal cervical cerclage in a woman with recurrent pregnancy losses. Afr J Med Health Sci. 2017; 16:131-2
16. Muhammed Z, Ibrahim SA. Cervical incompetence and pregnancy outcome in Jos University Teaching Hospital: A four-year Review. Borno Medical journal Online. 2018; 5:1.
17. Liddard A, Bhattacharya S, Crichton L. Elective and Emergency cerclage and immediate pregnancy outcomes: a retrospective observational study. JR Soc Med Sh Rep. 2011; 2:91.
18. Alabi- Isama L, Sykes L, Chandiraamani M, Patel S, Rai R, Bennelt PR. Time Interval from elective removal of cervical cerclage to onset of spontaneous labour. Eur J Obstet Gynecol Reprod Biol. 2012; 165(2):235-8.