

## EVALUATION OF CERVICAL CERCLAGE FOR SONOGRAPHICALLY INCOMPETENT CERVIX IN AT HIGH RISK PATIENTS

Shamshad, Yasmin Mustajab, Muhammad Jehanzaib\*

Department of Gynaecology, \*Department of Radiology, Ayub Medical College, Abbottabad

**Background:** To determine the impact of Cervical Cerclage (CC) for prolongation of pregnancy, maternal and foetal outcome. **Methods:** This Descriptive cross-sectional study was conducted over a period of 2 years patients with history of two or more recurrent midtrimester abortions/preterm deliveries were included. Those with abnormal foetus, vaginal bleeding and choreoamnionitis were excluded. All patients were subjected to transvaginal sonography. Those having sonographic evidence of cervical shortening/dilatation/cone formation were subjected to McDonald suture. Age, parity, period of gestation and aetiological factors were determined. **Results:** Results were evaluated on the basis of pregnancy prolongation, 14–28 weeks (7.5%), 28–36 weeks (18.7%), 35–37 weeks (73.7%), vaginal delivery in (70%), instrumental (1305%), Caesarean section (17.5%), miscarriage (7.5%), prematurity (18.7%), term delivery (73.7%), prenatal death (13.7%), foetal survival rate (85.1%). No intraoperative complication found. During pregnancy premature rupture of membrane (3.7%), abruption (2.5%), severe pre-eclampsia (3.7%). During labour cervical dystocia was found in (2.5%), foetal distress (8.7%), mal-presentations (6.2%), cervical trauma (3.7%). **Conclusion:** We determined a high success rate of cervical cerclage on properly selected patients with sonographic evidence of cervical changes. Cervical sonography can be a valuable adjunct to clinical evaluation of these patients.

**Key Words:** Cervical Incompetence (CI), Cervical Cerclage (CC), Transvaginal Sonography (TVS), Ultrasonography (USG), Recurrent Mid-trimester Pregnancy Loss (RMTPL)

### INTRODUCTION

Recurrent pregnancy loss generates intense concern and anxiety. Cervical Incompetence (CI) causes repeated mid trimester miscarriages and preterm delivery with high foetal wastage.<sup>1</sup> CI is defined as the inability to support a term pregnancy because of functional/structural defect of cervix.<sup>2</sup> It is characterized clinically by acute painless dilatation of cervix usually in mid trimester culminating in prolapse and/or premature rupture of membranes with resultant preterm and often previable delivery. CI accounts for 20–25% of all pregnancy losses during 2<sup>nd</sup> trimester as well as 10% of preterm labours. It affects 1% of all pregnant patients.<sup>3</sup>

Aetiology is multifactorial including congenital, diethylstilbestrol exposure in utero, connective tissues disorders and cervical trauma leading to functional loss.<sup>4-6</sup>

Diagnosis is mostly clinical. Past obstetrical histories of recurrent mid trimester miscarriages or preterm delivery are the basis of cerclage. Perspeculum or digital examination may show patulous os or bulging membranes and may confirm diagnoses but have not shown to improve outcome.<sup>7</sup> USG is the principal modality used during pregnancy to measure cervical length and opening<sup>8</sup>, in non pregnant ladies Hagar's test, Foley's catheter extraction, Hystero grams<sup>9,10</sup> and Hysteroscopy can be used. Cervical resistance index and cervical compliance score are other investigations.<sup>11</sup>

Many modalities of treatment including bed rest<sup>12</sup>, vaginal pessary<sup>14</sup> and progesterone have been tried but results are controversial. CC has become the mainstay

for management of CI. It is the application of stitch to keep the cervix closed and prevents premature dilatation. The first procedure was introduced by Shirodkar (1954) which was later modified by McDonald 1957.<sup>14</sup> Cerclage pessary has also been introduced. Trans abdominal cervicoisthmic cerclage has increase success rate regarding pregnancy prolongation and in those where transvaginal cerclage fails.<sup>15,16</sup> The objective of this study is to determine the impact of CC after USG assessment on prolongation of pregnancy, maternal and foetal outcome.

### MATERIAL AND METHODS

This Descriptive cross-sectional study was conducted in Gynaecology & Obstetrics Unit of Gomal Medical College over a period of two years from 1<sup>st</sup> Jan 2005 to 31<sup>st</sup> Dec 2006. A total of 8,600 pregnant patients were dealt. One hundred and ten patients included in the study suspected of having cervical incompetence having history of recurrent mid trimester pregnancy loss and preterm deliveries at least twice. A pre-designed proforma was used for relevant information regarding important details of history, examination, investigation and treatment. Inclusion criteria were pregnant ladies with previous 2 or more mid trimester pregnancy losses/premature deliveries. Patients with painful uterine contractions, vaginal bleeding, ruptured membranes, congenitally abnormal foetus and cervix more than 4 Cm dilated were excluded. transvaginal ultrasonography was used in all patients for measurements of cervical length, os diameter and funnelling. Eighty-four out of 110 patients were found to have subjective and objective evidence of CI. While remaining 26 patients were subjected to serial TVS

evaluation till 34 weeks to assess changes in cervical length. Among 84 patients of CI, 80 patients had undergone CC. In two cases fetuses were dead and in another two cases patients did not agree upon surgical intervention. Patients' age, parity and period of gestation were also taken in to account. History of previous surgery on cervix, repeated dilatation & curettage, difficult labours, instrumental deliveries and caesarean sections was determined. Patients were admitted a day before operation. McDonald suture was chosen for its simple technique. Non absorbable silk No. 2 was used to close cervix taking 4-5 bites tying the knot anteriorly at 12 O'clock position. Suture was planned at 11-14 weeks but those patients who presented late were also included up to 20 weeks and beyond. Antibiotics and analgesics were given to all patients. Suture was applied under general anaesthesia. Patients were observed in hospital for 24-48 hours post operatively. They were advised to refrain from heavy physical activity and coitus. Advice was given to report immediately in case of vaginal discharge, bleeding, painful contractions and pyrexia. Antenatal evaluation was carried out routinely. Suture was removed at 37 completed weeks and patients were observed for 2-4 hours afterwards and were sent home to come for antenatal check-up or when labour ensues whichever first.

**RESULTS**

Results are given in tabulated form. Total pregnant patients attended in two years were 8600. CI diagnosed in 84 patients. Frequency of CI was 9.7/1000 (0.97%). Frequency of McDonald was 9.3/1000 (0.93%).

Those suspected on history alone (26) were subjected to USG surveillance for any cervical change. No cerclage was needed in surveillance group.

**Table-1: Characteristics of the Patients**

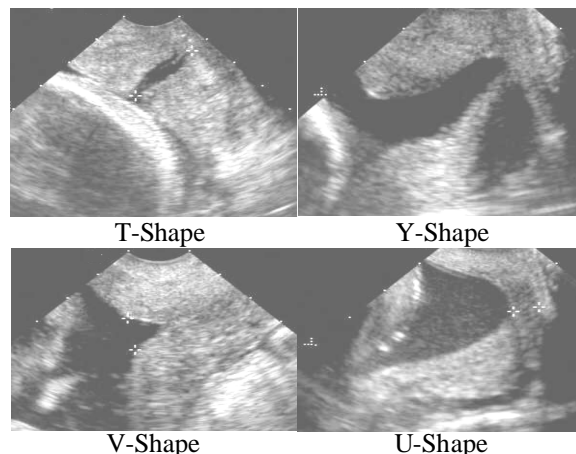
Variables		No.	%
Age (years)	25-29	35	43.7
	30-34	33	41.2
	35-40	12	15.0
Parity	0-1	23	28.7
	2-3	37	46.2
	> 4	20	25.0
	Gestation	11-14 weeks	46
	15-20 weeks	24	30.0
	> 20 weeks	10	12.5

**Table-2: Diagnostic Criteria**

Criteria used	No	%
History alone	26	23.60
History + T.V.S	75	68.18
History + Previous Cerclage+ T.V.S	5	4.50

**Table-3: Aetiological factors**

Factor	No	%
Previous D&C	12	15.0%
Instrumental or operative delivery/difficult labour	12	15.0%
Surgical procedure on cervix	0	0.0%
No apparent cause	52	65%
Bicornuate uterus	4	5.0%



**Figure-1: Funneling of the cervix with changes in forms of T, Y, V & U**



**Figure-2: Application of McDonald Suture**

**Table-4: Nature of Cerclage**

Nature	No	% age
Elective	65	81.2%
Emergency	15	18.7%

**Table-5: Prolongation of Pregnancy**

Weeks	No	%
14-28	6	7.5%
28-36	15	18.7%
35-37	59	73.7%

**Table-6: Mode of Delivery**

Mode	No	%
S.V.D	56	70%
Forceps	5	6.5%
Vacuum	5	6.5%
Caesarean	14	17.5%

**Table-7: Complications with Cerclage**

Timing	Complications	No	%	
During operation	Nil	0	0.0	
	During pregnancy	Premature Rupture of Membranes	3	3.7
		Abruption	2	2.5
During labour	Severe pre eclampsia	3	3.7	
	Cervical dystocia	2	2.5	
	Foetal distress	7	8.7	
	Malpresentation	5	6.2	
	Cervical. trauma	3	3.7%	

**Table-8: Outcomes of Pregnancies**

Outcome	No.	%
Miscarriage	6	7.6
Premature <37 weeks	15	18.7
Mature >37 weeks	59	73.7

**Table-9: Foetal Survival Rate**

Total live born	Prenatal death	Foetal survival rate	Survival %
74	11	63	85%

## DISCUSSION

Cervix is labelled incompetent when it is unable to retain an intrauterine gestation until term. It plays a fundamental role in supporting a pregnancy and preventing ascending infection. Infection is associated with early preterm delivery in half of the cases.<sup>17</sup> Whatever the aetiology of preterm delivery, dilatation of cervix is a common end point. We obtained an estimate of the frequency of CI by looking at cerclage rate, i.e., the extent to which the usual treatment of the condition is used in our study. The incidence was 9.3/1000 births. Waloch<sup>38</sup> (1996) reported an incidence of 11.47/1000 which is comparable to our study.

CI is recognized in reproductive age due to its clinical impact on reproductive function which is apparent from our study which represents 25–40 years age range. Most of our patients were of low parity which is quite reflective of the condition that leads to adverse outcome.<sup>18</sup> Gestational age ranged from 13–28 weeks. As most of the patients with RMTPL present at time when they start problem and those with recurrent pregnancy losses due to conceptus abnormality lead to 1<sup>st</sup> trimester miscarriage.<sup>19,20</sup>

A variety of aetiological factors for CI has been proposed. Our study have revealed a high percentage of cases (65%) with RMTPL without history of any appreciable trauma to cervix as study by Cousin<sup>22</sup> which showed 30–50% cases belonged to this group.<sup>22</sup> Cervical trauma sustained during forcible dilatation or cervical laceration during parturition can be the causes for CI.<sup>22</sup> Our study showed previous D&C in 15% while instrumental delivery and difficult labours in 15%. These cannot be stated as clear causative factors as we cannot assess the degree of damage to cervix with these events. Uterine malformations appears to be higher in women with late miscarriages and CI is frequently associated with uterine malformations.<sup>23</sup> These patients have term pregnancy rate of only 50%.<sup>24</sup> In our study there were 5.0% patients with uterine malformations. The diagnostic value of two and three dimensional USG has been explored and appears promising in this regard.<sup>25,26</sup> There is no truly diagnostic test for CI. Digital examination has low sensitivity. The role of USG has been extensively studied in patients with clinical diagnosis of CI.<sup>27-29</sup> Opening of cervical os at rest or in response to fundal pressure detected by TVS appears to be the early feature of cervical incompetence.<sup>30,31</sup> Cervical length of <25 mm on USG in patients with previous pregnancy losses is associated with a high risk of preterm birth (McDonald unpublished data). We used history, clinical examination and USG of cervix as diagnostic criteria. Shortening of

cervical length of <25 mm, cervical dilatation/cone formation were sufficient features for belief of CI.

Cervical cerclage was performed at 14 weeks and on wards to avoid genetically/environmentally determined spontaneous abortions. However optimal time is between 11–14 weeks. Mc Donald suture was chosen for its simplicity and technical ease. Transvaginal cerclage allows a high foetal survival rate in highly selected patients with poor obstetrical history.<sup>32</sup> The role of post-operative regimen remains controversial. We followed regimen described by Mc Donald and observed by Smith and Scragg.<sup>33</sup> Antibiotics were given to prevent infection as there is increased risk of preterm premature rupture of membranes with cerclage.<sup>34</sup> Bed rest, restriction of physical activity and sexual intercourse were advised as supportive measures. MRC/RCOG trial has reported increase risk of membranes rupture, trauma to cervix, difficulty of suture removal and choreoamneonitis.<sup>35</sup> Our success rate was satisfactory with post operative analgesics, antibiotics and bed rest. There were no intra operative complications. The cause of preterm delivery in few cases was 2<sup>nd</sup> trimester bleeding, placental abruption and severe pre eclampsia. There were also few cases of choreoamneonitis. There was no case of cervical trauma as stitch was removed electively at 37 completed weeks where pregnancies reached up till maturity. Some studies suggest increase obstetric intervention with cerclage as judged by admission to hospital, use of tocolytics, induction of labour and increase cesarean.<sup>36</sup> In our study a comparable relation was found regarding extra time in hospital associated with stitch insertion and removal, however, the onset of labour and mode of delivery were not affected. This was comparable to another study.<sup>37</sup> Caesarean section was performed for other obstetrical indications. Application of suture had not had any effect on caesarean section rate. About 82% had vaginal delivery and 17.5% had caesarean delivery. Main outcome in our study was prolongation of pregnancy and foetal outcome. Our miscarriage (7.5%) preterm (18.7%) and term delivery rates (73.7%) compared well with a study showing rates of 9.2%, 14% and 76.8% respectively.<sup>38</sup>

Foetal survival rate of 85% in our study is comparable to a study by Harger<sup>39</sup> showing rate of 87%. Our study suggests that a poor obstetrical history and pelvic USG form a reliable basis for diagnosis. Careful selection of patients, optimal timing of operation and method of cerclage can reduce the chances of complications and failure of procedure.

## CONCLUSION

Past history of recurrent mid trimester abortions or preterm deliveries when supported by transvaginal ultrasonography forms a reliable basis for diagnosis. It was observed that selective use of cervical cerclage had important effect in prolongation of pregnancy and

improving foetal survival rate. History alone is not an indication for prophylactic cerclage. Although transvaginal ultrasonography identifies women at risk of preterm delivery but it can not discriminate between different underlying pathologies. Same is true that short cervix alone is not an indication for therapeutic cerclage. Serial TVS measurements of cervical length in women with risk factors can identify those women truly at high risk of preterm delivery.

## REFERENCES

1. Al-Azemi M, Al-Qattan F, Omu A, Taher S, Al-Busiri N, Abdulaziz A. Changing trends in the obstetrics indications for cervical cerclage. *J Obstet Gynaecol*. 2003;23:507-11.
2. Rand L, Norwitz ER. Current controversies in cervical cerclage. *Semin Perinatol* 2003;27(1):73-85.
3. McDonald IA. Cervical cerclage. *Clin Obstet Gynaecol* 1980;7:461-79.
4. Abramovici H, Faktor JH, Pascal B. Congenital uterine malformations as indication for cervical suture (cerclage) in habitual abortions and premature delivery. *Int J Fertil* 1983;28:161-4.
5. Singer MS, Hochman M. Incompetent cervix in hormone-exposed offspring. *Obstet Gynaecol* 1978;51:625-6.
6. Cruickshank ME, Flannelly G, Campbell DM, Kitchener HC. Fertility and pregnancy outcome following large loop excision of the cervical transformation zone. *Br J Obstet Gynaecol* 1995;102:467-70.
7. Rudd, NL, Nimrod C, Holbrook KA, Byers PH. Pregnancy complications in type IV Ehlers-Danlos syndrome. *Lancet* 1983;1:50-3.
8. Buekens P, Alexander S, Boutsens M, Blondel B, Kaminski M, Reid M. Randomised controlled trial of routine cervical examination in pregnancy. European Community Collaborative Study Group on Prenatal Screening. *Lancet* 1994;144:841-4.
9. Andersen HF, Nugent CE, Wanty SD, Hayashi RH. Prediction of risk for preterm delivery by ultrasonographic measurement of cervical length. *Am J Obstet Gynaecol* 1990;163:859-67.
10. Ziliani M, Azuaga A, Calderon F, Pagés G, Mendoza G. Monitoring the effacement of uterine cervix by transperineal sonography. *J Ultrasound Med* 1995;14:719-24.
11. Anthony GS, Calder AA, MacNaughton MC. Cervical resistance in patients with previous spontaneous mid trimester abortions. *Br J Obstet Gynaecol* 1982;89:1046-9.
12. Zlatnik FJ, Burmeister LF. Interval evaluation of the cervix for predicting pregnancy outcome and diagnosing cervical incompetence. *J Reprod Med* 1993;38:365-9.
13. Althuisius SM, Dekker GA, Hummel P, Bekedam DJ, van Geijn HP. Final results of the Cervical Incompetence Prevention Randomized Cerclage Trial (CIPRACT): therapeutic cerclage with bed rest versus bed rest alone. *Am J Obstet gynaecol* 2001;185:1106-12.
14. McDonald IA. Suture of cervix for inevitable miscarriage. *J Obstet Gynaecol Br common* 1957;64:346-53.
15. Lotgering FK, Gaugler Senden IP, Loitering SF, Wallenberg HC. Outcome after transabdominal cervicoisthmic cerclage. *Obstet Gynaecol* 2006;107:779-84.
16. Cammarano CL, Herron MA, Parer JT. Validity of indications for transabdominal cervicoisthmic cerclage for cervical incompetence. *Am J Obstet Gynaecol* 1995;172:1871-5.
17. Davis G, Berghella V, Talucci M, Wapner RJ. Patients with prior failed transvaginal cerclage: a comparison of obstetric outcomes with either transabdominal or transvaginal cerclage. *Am J Obstet Gynaecol* 2000;183:836-9.
18. Shennan A, Jones B. The cervix and prematurity: aetiology, prediction and prevention. *Semin Fetal Neonatal Med*. 2004;9:471-9.
19. Mitani M, Matsuda Y, Ono E, Akizawa Y, Ohta H. Prognosis in cervical insufficiency at less than 32 weeks of gestation. *Eur J Obstet Gynaecol Reprod Biol*. 2006;125:34-7.
20. De Braekeleer M, Dao TN. Cytogenetic studies in couples experiencing repeated pregnancy losses. *Hum Reprod* 1990;5:519-28.
21. Clifford K, Rai R, Watson H, Regan L. An informative protocol for investigation of recurrent miscarriage: preliminary experience of 500 consecutive cases. *Hum Rprrod* 1994;9:1328-32.
22. Cousin L. Cervical incompetence, 1980: a time for reappraisal. *Clin Obstet Gynaecol* 1980;23:467-79.
23. Acein P. Incidence of mullerian defects in fertile and infertile women. *Hum Reprod* 1997;12:1372-6.
24. Acein P, Incidence of Mullerian defects in fertile and infertile women. *Hum Reprod* 1997;12:1372-6.
25. Grimbizis GF, Camus M, Tarlatzis BC, Bontis JN, Devroey P. Clinical implications of uterine malformations and hysteroscopic treatment results. *Hum Reprod* 2001;7:161-74.
26. Jurkovic D, Geipel A, Gruboeck K, Jauniaux E, Natucci M, Campbell S. Three dimensional ultrasound for assessment of uterine anatomy and detection of uterine anomalies: a comparison with hysterosalpingography and two dimensional sonography. *Ultrasound Obstet Gynaecol* 1995;5:233-37.
27. Berghella V, Odibo AO, To MS, Rust OA, Althuisius SM. Cerclage for short cervix on ultrasonography: meta-analysis of trials using individual patient-level data. *Obstetric Gynaecol* 2005;106:181-9.
28. Incerti M, Ghidini A, Locatelli A, Poggi SH, Pezzullo JC. Cervical length  $\leq 25$  mm in low-risk women: a case control study of cerclage with rest vs rest alone. *Am J Obstet Gynecol* 2007;197:315. e1-4.
29. To MS, Palaniappan V, Skentou C, Gibb D, Nicolaidis KH. Elective cerclage vs. ultrasound-indicated cerclage in high-risk pregnancies. *Ultrasound Obstet Gynaecol*. 2002;19:475-7.
30. McDonald R, Smith P, Vyas S. Cervical incompetence: the use of transvaginal sonography to provide an objective diagnosis. *Ultrasound Obstet Gynaecol*. 2001;18:211-6.
31. Daskalakis G, Thomakos N, Hatzioannou L, Mesogitis S, Papantoniou N, Antsaklis A. Cervical assessment in women with threatened preterm labor. *J Matern Foetal Neonatal Med*. 2005;17:309-12.
32. Golfier F, Bessai K, Paparel P, Cassignol A, Vaudoyer F, Raudrant D. Transvaginal cervicoisthmic cerclage as an alternative to transabdominal technique. *Eur J Obstet Gynaecol Reprod Biol*. 2001;100:16-21.
33. Smith SG, Scragg WH Jr. Premature cervical dilatation and the McDonald cerclage. *Obstet Gynaecol* 1969;33:535-40.
34. Hassan SS, Romero R, Maymon E, Berry SM, Blackwell SC, Treadwell MC, Tomlinson M. Does cervical cerclage prevent preterm delivery in patients with a short cervix? *Am J Obstet Gynecol*. 2001;184:1325-9.
35. MRC/RCOG Multi-centre randomized trial of cervical cerclage. *Br J Obstet Gynaecol* 1993;100:516-23.
36. Kuhn RJP. Cervical ligation. A review of 242 pregnancies. *Aust NZ J Obstet Gynaecol*. 1977;17:79-83.
37. Weissman A, Jakobi P, Zahi S, Zimmer EZ. The effect of cervical cerclage on the course of labour. *Obstet Gynaecol* 1990;76:168-71.
38. Waloch M. Cervical cerclage in the treatment of cervical incompetence in Zambian women. *Clin Exp Obstet Gynaecol* 1996;23:255-62.
39. Harger JH. Cerclage and cervical insufficiency. An evidence-based analysis. *Obstet Gynaecol* 2002;100:1313-4.

## Address for Correspondence:

**Dr. Shamshad Bibi**, Associate Professor, Department of Obstetric and Gynaecology, Khyber Girls Medical College, Hayatabad, Peshawar, Pakistan. Tel: +92-333-9965271