International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Chavan MS et al. Int J Reprod Contracept Obstet Gynecol. 2016 Nov;5(11):3924-3930
www.ijrcog.org

pISSN 2320-1770 | eISSN 2320-1789

DOI: http://dx.doi.org/10.18203/2320-1770.ijrcog20163866

Original Research Article

Comparison of perinatal outcome in twin pregnancy with and without cervical cerclage

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Received: 31 August 2016
Accepted: 28 September 2016

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ABSTRACT

Background: The incidence of multifetal pregnancies has registered increase globally. Babies born from multiple-birth pregnancies are much more likely to result in premature birth than those from single pregnancies. Knowledge of role of cervical cerclage in preventing preterm birth especially in twin pregnancy can be helpful to prevent complication related to preterm birth and ultimately of low birth weight babies.
Methods: Depending upon who opt for the procedure 100 patients were divided equally into two groups: 1)Twin pregnancy with cervical cerclage; 2)Twin pregnancy without cervical cerclage. We measured maternal outcomes which include time for which patient required to be hospitalized, maternal pyrexia, cervical or bladder injury and other maternal morbidity and perinatal outcomes which include preterm delivery (delivery before 37 completed weeks), low birth weight (birth weight ≤2000 g), IUGR, perinatal mortality, indicators of perinatal morbidity (APGAR scores and neonatal unit admission), stillbirth, second trimester loss and presence of congenital malformations.
Results: In Study group 22% delivered before 34 weeks of gestation, 46% delivered between 34 and 37 weeks of gestation, 32% delivered after 37 weeks of gestation compared to 44%, 48% and 8% respectively in Control group. The mean gestational age at delivery was 35.3 weeks in Study group and was 33.2 weeks in Control group. In study group 47% neonates had birth weight less than 2Kg and in Control group 69% neonates had birth weight less than 2Kg. In Study group 95% had Apgar score more than 6 whereas in Control group 86% had APGAR score more than 6. The mean APGAR for Study group was 8.5 and for Control group was 7.5. 45% neonates had complications in Study group whereas 67% neonates in Control group. Overall Low birth weight was most common complications in both the groups. Respiratory distress was more common in Control group.
Conclusions: In spite of close vigilance, preterm birth in twin gestation is common and unpredictable. It is difficult to predict those who may require cervical cerclage although all multiple pregnancies are at high risk. Cerclage should be considered an option for patients with twin pregnancies in the second trimester to prolong the duration of gestation as close to term as possible.

Keywords: Cerclage, Preterm, Twins

INTRODUCTION

The incidence of multifetal pregnancies has registered increase globally. This is partly due to the widespread use of ovulation induction drugs in the treatment of infertility, assisted reproductive technology and also due to delaying childbearing to a later age.

With the development of ultrasound techniques, it has become apparent that incidences of multiple gestations are more common than previously indicated which can be done as early as 6-7 weeks of gestation.

Babies born from multiple-birth pregnancies are much more likely to result in premature birth than those from

single pregnancies. 51% of twins and 91% of triplets are born preterm, compared to 9.4% in singletons.[1] 14% of twins and 41% of triplets are even born very preterm, compared to 1.7% in singletons.[1] The preterm births in multiples tending to have a lower birth weight which ultimately leads to hypothermia, respiratory difficulties, PDA, intracranial bleeding, hypoglycemia, necrotizing enterocolitis, infection, ROP and death.[2-5] Preterm birth is leading cause of neonatal death and India being with greatest number of preterm births.[6]

The probable reasons for preterm birth are overdistention of uterus and intrauterine infection[7] which may be because of early opening of cervix and exposure of fetal membranes to the bacterial flora of vagina.[8] Also the risk of preterm birth is inversely proportion to the cervical length.[9]

Cervical cerclage (tracheloplasty), also known as a cervical stitch, is used for the treatment of cervical incompetence (or insufficiency), a condition where the cervix has become slightly open or closed with short in length.[10] Use of cerclage include the management of women considered to be at high risk of mid-trimester loss and spontaneous preterm birth by virtue of factors such as multiple pregnancy, uterine anomalies, a history of cervical trauma and cervical shortening seen on sonographic examination. While cerclage may provide a degree of structural support to a 'weak' cervix, its role in maintaining the cervical length and the endocervical mucus plug as a mechanical barrier to ascending infection may be more important.

This study was for knowledge of role of cervical cerclage in preventing preterm birth especially in multifetal gestation to prevent complication related to preterm birth and ultimately of low birth weight babies with their poor perinatal outcome.

METHODS

This was a prospective observational study in the department of obstetrics and gynaecology at Tertiary care centre hospital, Mumbai, Maharashtra, India.

Inclusion criteria

All women presenting with viable twin pregnancy between 16 and 22 weeks of gestation

Exclusion criteria

All women with twin pregnancy presenting with

- Bleeding per vaginum
- Already proven upper genital infection or chorioamnionitis
- PPROM (Preterm Premature Rupture Of Membranes)
- IUFD (Intrauterine Fetal Death)
- Malformed foetus
- Uterine anomalies
- Threatened preterm
- Low lying placenta
- Pre-existing maternal medical illness like cardiovascular, pulmonary, renal, hepatic and endocrine disease.

Study procedure

- 100 women selected who fit in the above mentioned criteria.
- Baseline data was recorded by questionnaire and patient interview.
- Once the patient enrolled herself in the study, an ultrasonography was done as routine procedure for fetal wellbeing.
- All the patients with twin pregnancy registered in antenatal OPD between 16-22 weeks of gestation were explained the necessity of cerclage.
- Depending upon who opt for the procedure patients were divided into two groups
    - Study group → Twin pregnancy with cervical cerclage.
    - Control group → Twin pregnancy without cervical cerclage.
- All the patients were subjected to standardized form of management.
- Any incident such as IUGR (Intra Uterine Growth Retardation), IUFD (Intra uterine Fetal demise), LBW (Low birth weight), PROM (Premature rupture of membranes), bleeding, bladder or cervical injury, maternal pyrexia, etc was recorded.
- Potential confounding factors were identified and adjustment was made in statistical models. These factors include maternal age, gravidity, gestational diabetes, gestational hypertension, sepsis.
- The following adverse pregnancy outcomes among the two groups will then be compared: Second trimester loss, IUGR, preterm labor (labor <37 weeks of gestation), PPROM (membrane rupture <37 weeks of gestation), Stillbirth, death following live birth, discordant growth (difference between weight of twins >20%), congenital anomaly, twin-twin transfusion

End point

- The end point of the study was achieved with the delivery of the baby and its course till discharge from the hospital
- Any patient not willing for further participation in the study at any time could withdraw.

Outcome measures

- Maternal outcome

- Maternal pyrexia
- Cervical or bladder injury
- Other maternal morbidity
- Time for which patient required to be hospitalized

- Outcome of the pregnancy
  - Onset of Labour
  - Gestational age at the time of delivery
  - Mode of delivery
- Neonatal outcome
  - Preterm delivery (delivery before 37 completed weeks)
  - Low birth weight (birth weight ≤2500 g)
  - IUGR (Intrauterine Growth Retardation)
  - Perinatal mortality
  - Perinatal morbidity
    - APGAR scores
    - Neonatal unit admission
    - Stillbirth
    - Second trimester loss
    - Presence of congenital malformations

Statistical analysis

The results were expressed as Mean +/_ SD and Proportion (%).

Statistical tests used were Chi square test, Fischer's exact test.

RESULTS

Table 1: Association of weeks of gestation at delivery among study group and control group.

Weeks at delivery		Cerclage	Total	
		Yes	No	
Before 34 Wks	Count	11	22	33
	%	22.0%	44.0%	33.0%
34 to 37 Wks	Count	23	24	47
	%	46.0%	48.0%	47.0%
After 37 Wks	Count	16	4	20
	%	32.0%	8.0%	20.0%
Total	Count	50	50	100
	%	100%	100%	100%
Chi-square test	Value	df	P value	Significant
Pearson Chi-Square	10.888	2	0.004	

Table 1 shows association of weeks of gestation at delivery between two groups. Number of women who were undergone cerclage and delivering after 37 weeks were significantly high. (Statistically significant p=0.004).

Table 2: Association of mode of delivery among study group and control group.

Mode of delivery		Cerclage		Total
		Yes	No	
Elective LSCS	Count	14	4	18
	%	28%	8.0%	18.0%
Emergency LSCS	Count	29	32	61
	%	58%	64%	61%
Full term vaginal delivery	Count	1	1	2
	%	2.0%	2.0%	2.0%
Preterm vaginal delivery	Count	6	13	19
	%	12%	26%	19%
Total	Count	50	50	100
	%	100%	100%	100%
Chi-Square test	Value	df	P value	Significant
Pearson Chi-square	8.282	3	0.041	

Table 2 shows association of mode of delivery between two groups.

Number of women who were undergone cerclage and had elective LSCS were 14 and preterm vaginal delivery 6 compared to 4 and 13 that of not undergoing cerclage respectively (Statistically significant p=0.041).

Table 3: Association of APGAR of neonates among study group and control group.

Apgar		Cerclage		Total
		Yes	No	
Less than 7	Count	5	14	19
	%	5.0%	14.0%	9.5%
7 and above	Count	95	86	181
	%	95%	86.0%	90.5%
Total	Count	100	100	200
	%	100%	100%	100.0%
Chi-Square test	Value	df	P value	Significant
Pearson Chi-square	4.710	1	0.029	

Table 3 shows association of Apgar score of Neonates at 5 minutes of two groups.

There were 14 neonates whose Apgar score was less than 7 and their mother were not undergone cerclage compare to 5 neonates that of undergoing cerclage (Statistically significant p=0.029).

Table 4: Association of birth weight of neonates among study group and control group.

Birth weight		Cerclage		Total
		Yes	No	
Up to 1 Kg	Count	5	16	21
	%	5.0%	16.0%	10.5%
1.001 to 1.5	Count	12	27	39
	%	12%	27.0%	19.5%
1.501 to 2 Kg	Count	30	26	56
	%	30%	26.0%	28.0%
2.001 to 2.5 Kg	Count	40	27	67
	%	40%	27.0%	33.5%
>2.5 Kg	Count	13	4	17
	%	13%	4.0%	8.5%
Total	Count	100	100	200
	%	100%	100%	100.0%
Chi-Square test	Value	df	P value	Significant
Pearson Chi-square	19.410	4	0.007	

Table 4 shows association of birth weight of neonates between two groups.

The mother who were undergone cerclage, there were 13 neonates whose birth weight was more than 2.5Kg and 5 neonates whose birth weight was less than 1Kg compare to 4 and 16 neonates respectively of those who were not undergone cerclage (Statistically significant p=0.007).

Table 5: Association of number of neonates requiring NICU admission among study group and control group.

NICU admission		Cerclage		Total
		Yes	No	
Yes	40	56	96	40
	40.0%	56%	48.0%	40.0%
No	59	39	98	59
	59.0%	39%	49.0%	59.0%
NA	1	5	6	1
	1.0%	5.0%	3.0%	1.0%
Total	100	100	200	100
	100%	100%	100%	100.0%
Chi-Square test	Value	df	P value	Significant
Pearson Chi-square	9.410	2	0.009	

Table 5 shows association of neonates requiring NICU admission between 2 groups.

The mother who were not undergone cerclage, there were 56 neonates who required NICU admission compare to 40 neonates of those who were undergone cerclage (Statistically significant p=0.009).

Table 6: Association of duration of stay in NICU of neonates among study group and control group.

NICU stay (if any)		Cerclage		Total
		Yes	No	
Up to 3 days	Count	22	15	37
	%	55%	26.8%	38.5%
4 to 7	Count	3	5	8
	%	7.5%	8.9%	8.3%
8 to 15	Count	4	9	13
	%	10%	16.1%	13.5%
16 to 30	Count	9	21	30
	%	22.5%	37.5%	31.4%
> 30 days	Count	2	6	8
	%	5.0%	10.7%	8.3%
Total	Count	40	56	96
	%	100%	100%	100.0%
Chi-Square test	Value	df	P value	Significant
Pearson Chi-square	8.100	4	0.088	

Table 6 shows association of NICU stay of neonates between two groups.

The mother who were not undergone cerclage, there were 27 neonates who required more than 15 days NICU stay compare to 11 neonates of those were undergone cerclage (Statistically not significant p=0.088).

Table 7: Association of neonatal complications among study group and control group.

Neonatal complication		Cerclage		Total
		Yes	No	
Yes	45	67	112	45
	45.0%	67%	56.0%	45.0%
No	55	33	88	55
	55.0%	33%	44.0%	55.0%
NA	100	100	200	100
	100%	100%	100%	100.0%
Total	100	100	200	100
	100%	100%	100%	100.0%
Chi-Square test	Value	df	P value	
Pearson Chi-square	9.810	1	0.001	Significant
Fisher's exact test			0.002	

Table 7 shows association of neonatal complications between two groups.

The mother who were not undergone cerclage, there were 67 neonates who had neonatal complications compare to 45 neonates of those were undergone cerclage. (Statistically significant p=0.001).

Table 8: Number of neonatal complications in study group and control group.

Neonatal complications	Cerclage		Total
	Yes	No	
Hypoglycaemia	5	5	10
Hyperbilirubinemia	4	14	18
Hypothermia	2	1	3
Low birth weight	30	31	61
Respiratory distress	7	15	22
Sepsis	10	16	26
Twin to twin transfusion	0	2	2
Hypoxia induced Encephalopathy	0	1	1
Chi-square test	Value	df	P value
Pearson Chi-square	8.401	7	0.299

P value: Significant

Table 8 shows association of neonatal complications between two groups.

Overall the low birth weight was most common complications among all neonates. There is no statistically significant association between two groups. (p=0.299).

Table 9: Comparison of perinatal mortality in study group and control group.

Perinatal mortality	Cerclage		Total
	Yes	No	
Macerated Still Birth	1	3	4
Fresh Still Birth	0	2	2
Neonatal Death	4	6	10
Chi-square test	Value	df	P value
Pearson Chi-square	1.388	2	0.512

P value: Significant

Table 9 shows association between two groups related to perinatal mortality.

It is more in women not undergone cerclage than women undergone cerclage. (Statistically not significant p=0.512).

Table 10: Distribution of method of conception with respect to cerclage.

Method of conception		Cerclage		Total
		Yes	No	
Yes	Count	30	42	72
	%	60%	84.0%	72.0%
No	Count	20	8	28
	%	40%	16.0%	28.0%
NA	Count	50	50	100
	%	100%	100%	100.0%
Total	100	100	200	100
	100%	100%	100%	100.0%
Fisher's exact test			0.002	

DISCUSSION

The study included 100 cases out of which 50 were undergone MacDonald's cervical cerclage (forming "Study group") and the remaining 50 were not undergone cerclage (forming "Control group").

In present study, Mean gestational age at the time of cerclage was 17.6%. The gestational age at the time of cervical cerclage was not found to be related to the perinatal outcome in study group.

Table 10: Gestational age at cervical cerclage.

Authors	Mean gestational age at cervical cerclage (weeks)
Rebarber A et al[11-12]	13.1
Aguilera M et al[13]	20.6
Liddiard A et al[14]	21.0

Operative complications

Aguilera M et al, There were no complications related to the procedure of cerclage.[13]

In present study, there were no operative complications noted, signifying its safety.

Gestation age at delivery

Liddiard A et al, Mean gestational age at delivery in group of women undergone cervical cerclage was 35 weeks.[14]

Dor J, Preterm vaginal delivery were 45.4% in women undergone cerclage compare to 47.8% in women not undergone cerclage.[15]

Kunsch U et al, Out of women undergone cervical cerclage 100% delivered after 34 weeks whereas 17% delivered after 34 weeks in women not undergone cerclage.[16]

Aguilera M et al, Out of women undergone cervical cerclage 61.5% delivered after 30 weeks, 30.8% after 32 weeks and 23% before 24 weeks of gestation.[13]

Collins A et al, Out of women undergoing cervical cerclage 6% delivered before 30 weeks, 13% delivered before 34 weeks.[17]

Rebarber et al, Women undergone cervical cerclage had mean gestational age at delivery of 33.5 weeks.[11,12]

In present study, mean gestational age at delivery for study population was 34.2 weeks, for Women undergone cerclage was 35.3 weeks and for women not undergone

cerclage was 33.2 weeks. Also, women undergone cerclage and delivering after 37 weeks of gestation were 32% whereas women not undergone cerclage and delivering after 37 weeks of gestation were 8%. This signifies that women not undergone cerclage had more number of preterm births.

Mode of delivery

Normon JE et al, In women with twin gestation with placebo therapy LSCS rate was 59.2% and instrument delivery rate was 8.8% whereas in study group with women with twin gestation undergoing progesterone support therapy it was 64.4% and 12% respectively.[18]

In present study, the women who had undergone cerclage had LSCS rate of 86% compare to 72% of that of women not undergone cerclage.

Birth weight

Kunsch U et al, In women undergone cervical cerclage 91% neonates had more than 2Kg birth weight and 76% neonates of women not undergone cerclage had birth weight of more than 2Kg.[16]

Weekes ARL et al, The mean birth weight of neonates was 2.55Kg in women undergone cerclage and was 2.44Kg in women not undergone cerclage.[19]

In present study, the mean birth weight of neonates was 1.825Kg in study population, was 1.976Kg in women undergone cerclage and was 1.673Kg in women not undergone cerclage. In women undergone cervical cerclage 53% neonates had more than 2Kg birth weight and 31% neonates of women not undergone cerclage had birth weight of more than 2Kg. There was statistically significant difference between two groups.

APGAR score

In present study, Mean APGAR score for study population was 8, for women undergone cerclage was 8.5 and for women not undergone cerclage was 7.5. There was statistically significant difference between two groups.

NICU admission

Norman JE et al, In women with twin gestation with placebo therapy 32% neonates required NICU admission whereas 33.8% neonates of study group required NICU admission.[18]

In present study, in women undergone cerclage 45% neonates required NICU admission whereas in women not undergone cerclage 67% neonates required cerclage and overall 56% neonates required NICU admission. There was statically significant difference between two groups.

NICU stay

Norman JE et al, in women with twin gestation with placebo therapy mean NICU stay for neonates was 8.7 days whereas for neonates of study group it was 7.5 days.[18]

In present study, in women undergone cerclage mean NICU stay for neonates was 4 days whereas in women not undergone cerclage it was 7 days and overall it was 6.1 days.

Perinatal morbidity and mortality

Liddiard A et al, 1 neonatal death occurred in 116 patients who undergone cerclage.[14]

Dor J et al, in women undergone cerclage neonatal death were 18.2% compare to 15.2% in women not undergone cervical cerclage.[15]

Kunsch U et al, There was no perinatal mortality in women undergone cerclage whereas 1 neonatal death was there in women not undergone cerclage.[16]

Norman JE et al, There were 8 neonatal deaths and 6 intrauterine deaths in study group compare to 6 neonatal deaths and 4 intrauterine deaths.[18]

Weekes ARL et al, in women undergone cerclage perinatal death were 8 out of 120 compare to 3 out of 74 in women not undergone cerclage.[19]

In women undergone cerclage there were 4 neonatal deaths and 1 macerated still birth. In women not undergone cerclage there were 6 neonatal deaths, 2 fresh still births and 3 macerated still births. There was significantly increased perinatal mortality in women not undergone cerclage.

CONCLUSION

In spite of close vigilance, preterm birth in twin gestation is common and unpredictable. One of the factors of preterm birth in twin gestation is uterine overdistention. This can be prevented by cervical cerclage. My study supports this hypothesis.

Elective cervical cerclage appear to have low complication rates and high live-birth rates. MacDonald's cervical cerclage can prolong the gestational period. Hence, it is helpful in decreasing the incidences of premature neonate, low birth weight neonate and ultimately its further consequences. Neonates with very premature birth should be managed in the NICU where they can be closely monitored and treated.

MacDonald's cervical cerclage is completely safe if done by skilled person. So offering prophylactic MacDonald's cervical cerclage in twin gestation between 16 and 20 weeks will not harm the women.

It is difficult to predict those who may require cervical cerclage although all multiple pregnancies are at high risk. Cerclage should be considered an option for patients with twin pregnancies in the second trimester.

Pathogenesis of preterm birth is multifactorial in twin gestation. Hence prophylactic cervical cerclage is not only solution for preventing preterm birth in twin gestation. But according to my study results, it's one of the tools to prevent preterm birth in twin gestation.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

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Cite this article as: Chavan MS, Jassawalla MJ. Comparison of perinatal outcome in twin pregnancy with and without cervical cerclage. Int J Reprod Contracept Obstet Gynecol 2016;5:3924-30.