

Routine Cervical Cerclage in Higher Order Multiple Gestation — Does It Prolong the Pregnancy?

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Preterm birth following cervical dilatation is the greatest threat to infants of a multiple pregnancy. Lacking reliable data concerning the effect of prophylactic cerclage, we compared a study group to controls for maternal and perinatal outcome. Sixteen of 94 triplet-, 9 of 18 quadruplet/quintuplet-pregnancies, treated with prophylactic cerclage, were retrospectively compared to those without cervical cerclage respectively. Kruskal-Wallis test and Mann-Whitney-U test were performed as non-parametric one way analysis of variance. For the analysis of frequencies Chi Square test or Fisher's exact test were performed. Odds ratio with 95% confidence interval was used to compare the need for intravenous tocolysis as well as perinatal morbidity and mortality. Gestational age at delivery was not different from the controls in all studied groups. Birth weight revealed a 200g dominance for the "no cerclage-triplets", while this significant difference was inverted for quadruplets/quintuplets (1245g vs. 1069g). With respect to gestational age at birth, need for hospitalisation or medical intervention no benefit was achieved. Moreover, perinatal outcome analysed by arterial pH, APGAR-Score and perinatal mortality was not altered by a prophylactic cerclage. Perinatal morbidity for quadruplets and quintuplets was even higher in cerclage pregnancies. Therefore, these retrospective results disclaim a positive impact of cervical cerclage on pregnancy management or perinatal outcome in multifetal pregnancies.

Prematurity has the highest impact on the outcome of multiple pregnancies. The risk of preterm birth and analogous adverse fetal outcome increases with the number of fetuses. For twins, it is up to four times that in singletons (Day et al., 1997). The incidence of preterm delivery is reported to be 30–50% in twins and 66–100% in higher order multiples (Crowther, 1998). Preterm labor, premature preterm rupture of the membranes (PPROM) or cervical dilatation can lead to preterm delivery. Effective prevention of preterm birth would be the major breakthrough with a significant impact on the outcome of multiple pregnancies.

Cervical dilatation is a frequent complication particularly in case of multiple pregnancies and is sometimes considered an indication for prophylactic cervical cerclage. The true incidence of the cervical affection is difficult to assess. In the literature, a range from 8–15% is reported.

Several prenatal interventions aimed at prolonging multiple pregnancies have been validated. Two trials that assessed the value of prophylactic cervical cerclage in 50 and 194 twin pregnancies found no difference concerning

the risk of preterm birth or perinatal mortality (Dor et al., 1982; Rush et al., 1984). Nevertheless, the presented data is too sparse to give any clear picture of the potential effects of routine cerclage in twins.

The aim of this study is to evaluate the effect of prophylactic cervical cerclage on perinatal outcome of higher order multiple pregnancies in order to clarify the "cerclage dilemma".

Materials and Method

Ninety-four consecutive triplet-, 14 quadruplet- and 4 quintuplet-pregnancies were managed at Department of Obstetrics and Gynecology — Großhadern, Munich University Hospital between 1 January, 1982 and 31 December, 1999. In 16 of 94 (17%) triplet-, in 6 of 14 (42.9%) quadruplet- and in 3 of 4 (75%) quintuplet-pregnancies the cervix uteri was sutured in order to prevent preterm cervical dilatation. Study groups were retrospectively compared to controls, managed conservatively, for the number of fetuses and gestational age (> 25 weeks of gestation) and were analysed for pregnancy management complications and perinatal outcome.

Cervical interventions were performed during the whole study period (1985–1999). Routine cerclage was performed in second trimester: In triplets between 98 to 138 day of gestation (mean 114) and in quadruplets and quintuplets between 78 to 152 day of gestation (mean 107). The only indication for cerclage was the number of fetuses > 2. Both Shirodkar's and McDonald's technique were used. No patient underwent an emergency cerclage. All cervical operations were performed outside our hospital and before patients were referred. Patient selection and time as well as technique of operation were determined by individual obstetricians ($n = 23$). As we were not involved in the preoperative care and decisions leading to the cerclage, the rate of perioperative (early) complications (failure of cerclage, infection, preterm labor, PPROM) as well as pregnancy losses was not accessible for assessment.

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Obstetrical and pediatric records formed the data pool for the assessment of prenatal care and perinatal outcome. All mothers who delivered outside our unit had to be excluded from the analysis for heterogeneous prenatal care and delivery indications or the lack of documentation of outcome data.

Beside cerclage placement, pre- and perinatal management was identical for both groups. Bed rest, hospitalisation, use and dosage of tocolytic drugs, indications and mode of delivery as well as postnatal pediatric treatment, appropriate to the time dependent state of the art over the study period, did not imply any differences between the groups studied. Overall, only four quintuplet-pregnancies were delivered. Three of these had had a prophylactic cerclage performed compared to only one pregnancy without cervical intervention. Lacking a control group $n > 1$ for quintuplets, a combination integrating both — quadruplets and quintuplets — was established.

In addition to mortality, perinatal morbidity defined as serious health impairment (respiratory distress syndrome, retinopathy of prematurity, intracerebral hemorrhage, sepsis, hydrocephalus, pneumothorax, necrotizing enterocolitis or patent ductus arteriosus) diagnosed before discharge from hospital, was a major outcome parameter.

For statistics Kruskal-Wallis test and Mann-Whitney-U test were performed as non-parametric one way analysis of variance. For the analysis of frequencies Chi-Square test or alternatively (if required by the statistical regulations) Fisher's exact test was performed. Odds ratio with 95% confidence interval was used to compare the need for intravenous tocolysis as well as perinatal morbidity and mortality. Significance was defined as $p < 0.05$.

Results

One hundred and twelve women delivered triplets, quadruplets or quintuplets between 1 January, 1982 and 31 December, 1999 at Department of Obstetrics and

Table 1
Influence on Pregnancy Management Through a Prophylactic Cervical Cerclage in Higher Order Multiple Pregnancies.

Triplets	Cerclage (n = 16)	No Cerclage (n = 78)	Odds Ratio (Confidence Interval)	Statistical Significance
Gestational age at hospitalisation (day)	187(159–225)	194(152–236)	—	* ($p < 0,001$)
Intravenous tocolytic therapy (%)	88 (14/16)	59 (46/78)	4,87(1,0–22,9)	n.s.
Duration of intravenous tocolysis (days)	12,4 (0–51)	17,6(0–63)	—	n.s.
Quadruplets/Quintuplets	(n = 9)	(n = 9)		
Gestational age at hospitalisation (day)	170(149–200)	172(160–202)	—	n.s.
Intravenous tocolytic therapy (%)	89 (8/9)	100 (9/9)	0,89(0,0–16,7)	n.s.
Duration of intravenous tocolysis (days)	21,5 (0–51)	25,3(1–51)	—	n.s.

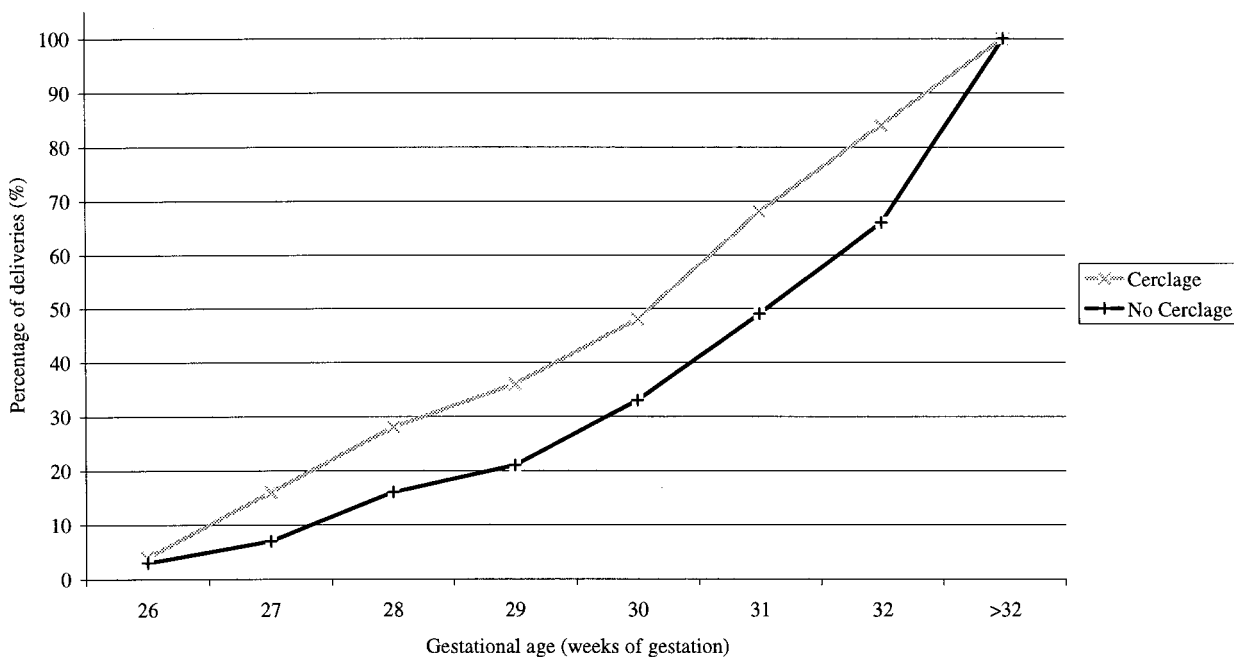


Figure 1
Proportion of deliveries of cerclage- and no cerclage-pregnancies based on gestational age.

Gynecology, Großhadern, Munich University Hospital. Twenty-five mothers who had undergone prophylactic cervical cerclage were retrospectively compared to 87 mothers managed conservatively. Demographic data in the surgical and the conservative group did not differ.

ART were responsible for the exponential rise of multiple pregnancies in the last one and a half decades. In both sets of multiples, natural conception was present in 20% (5/25) for cerclage pregnancies vs. thirteen percent (11/87) for surgically untreated pregnancies ($p = 0.356$). All but one triplet pregnancy (control group) were delivered by cesarean section.

No reduction in the rate or duration of intravenous tocolytic therapy (Fenoterol) could be achieved. Table 1 lists the influence of prophylactic cervical cerclage on pregnancy management in higher order multiple pregnancies. Figure 1 displays the proportion of deliveries of all higher order multiples by a given gestational age. The relative frequency of low gestational age birth was not reduced by a prophylactic cervical cerclage.

In all pregnancies six outcome factors were recorded: Birth weight, gestational age, APGAR-Score (5'), and arterial pH value as well as perinatal morbidity and mortality are registered in Table 2. Mean arterial pH and APGAR-Scores after 5 minutes of life were equal in all groups. Triplet-morbidity was 30% in both, study and control group, counting 14/47 and 68/225 respectively ($p = 0.970$). Among quadruplets/quintuplets perinatal morbidity was significantly higher in cerclage pregnancies with 69% (24/35) versus 32% (11/34) in pregnancies without cerclage. Perinatal mortality however, did not display a difference between the cerclage and no cerclage group.

Discussion

Preterm birth remains the greatest threat to infants of a multiple pregnancy. Despite advances in perinatology, our ability to effectively prevent preterm delivery remains insufficient. Thus, no standard regime can be offered, and controversially discussed therapeutic efforts are in general use.

In this study no major difference was found in terms of mode of conception, pregnancy or delivery management when higher order multiple pregnancies were retrospectively compared for the effects of a prophylactic cervical cerclage. No benefit with respect to gestational age at time of delivery, need for hospitalisation or medical intervention (Fenoterol) was achieved. Birth weight was explicitly opposite in the triplet versus quadruplet/quintuplet study groups. Moreover, no positive effect of routine cervical cerclage could be observed respecting perinatal morbidity and mortality. In conclusion, these results disclaim the hypothetical benefit of prophylactic cervical cerclage aimed to either prolong the higher order multiple pregnancy or decrease the need for intravenous tocolytics or maternal hospitalisation.

No single therapeutic initiative has been shown to reduced the incidence of preterm delivery in very premature twins (Crowther, 1998; Dor et al., 1982; Jewelewicz, 1991; Rush et al., 1984). The benefit of routine cervical cerclage placement in singleton and twin pregnancies at risk for preterm labor, without previous diagnosis of cervical incompetence, is yet to be demonstrated (Michaels et al., 1991; MRC/RCOG Working Party on Cervical Cerclage, 1993; Weeks et al., 1977; Yeast & Garite, 1988). On the other hand, an augmented risk for postoperative chorioamnionitis (1–5%) followed by PPROM or uterine irritability is repeatedly noted after prophylactic cerclage (Jewelewicz, 1991; Yeast & Garite, 1988). There is also evidence of an increase of prostaglandin $F_{2\alpha}$, a potent myometrial stimulant, immediately after the operation (Bibby et al., 1979). Big series report overall fetal survival rates of 85% for pregnancies treated with cervical cerclage on indication (Bacchus & Hay, 1970).

From reports in literature, one can assume that complications associated with prophylactic cerclage are comparable in higher order multiple and singleton/twin pregnancies. "(Bacchus & Hay, 1970; Bibby et al., 1979; Elimian et al., 1999; Jewelewicz, 1991; Yeast & Garite, 1988). Emergency procedures are associated with 80% fetal survival if cervix dilatation is less than 5cm but only 24% if it is more than 5cm (Jewelewicz, 1991). Thus, cervical

Table 2

Perinatal Outcome Parameters with or Without Cervical Cerclage in Higher Order Multiple Pregnancies (Gestational Age at Delivery, Birth Weight, Arterial pH, APGAR-Score 5', Perinatal Mortality and Morbidity).

Triplets	Cerclage (<i>n</i> = 16)	No Cerclage (<i>n</i> = 78)	Odds ratio (Confidence Interval)	Statistical Significance
Gestational age at delivery (day)	220(175–255)	223(189–247)	—	n.s.
Birth weight (g)	1368(550–2410)	1568(570–2420)	—	* ($p < 0,001$)
Arterial pH	7,31(7,18–7,40)	7,30(7,09–7,40)	—	n.s.
APGAR-Score 5'	9 (6–10)	9 (4–10)	—	n.s.
Perinatal mortality (%)	2,08 (1/48)	3,42 (8/234)	0,60(0,1–4,9)	n.s.
Perinatal morbidity (%)	30 (14/47)	30 (68/225)	0,98(0,5–1,9)	n.s.
Quadruplets/Quintuplets	(<i>n</i> = 9)	(<i>n</i> = 9)		
Gestational age at delivery (day)	204(177–220)	208(189–226)	—	n.s.
Birth weight (g)	1245(580–2000)	1069(505–1540)	—	* ($p < 0,001$)
Arterial pH	7,30(7,15–7,38)	7,30(7,24–7,42)	—	n.s.
APGAR-Score 5'	8 (5–10)	8 (4–10)	—	n.s.
Perinatal mortality (%)	10,26 (4/39)	5,55(2/36)	1,94(0,3–11,3)	n.s.
Perinatal morbidity (%)	69 (24/35)	32 (11/34)	4,56(1,7–12,6)	*

Note: * significant difference

cerclage based on sonographic or clinical criteria promises a hypothetical benefit preventing birth of very low birth weight infants in a narrow selection of patients (Ayers et al., 1988; Michaels et al., 1991)

In higher order multiple pregnancies prophylactic cervical cerclage remains a prenatal intervention of undetermined value. Can the recommendations for the risk management of twins be transferred to multifetal pregnancies as well? Procedure-immanent risks without an improvement in pregnancy outcome establish our rationale opposing routine cerclage as an obstetrical strategy in all multifetal pregnancies. As we studied an overall small, yet rapidly growing obstetrical entity of “superpregnancies”, so far, our recommendations have to rely on a retrospective analysis of a limited number of pregnancies. Based on the small differences between study groups, we can calculate the number needed to reveal a significant effect of routine cervical cerclage on fetal outcome in a randomised controlled study to be no less than 430 multifetal pregnancies. Nevertheless, definite guidelines cannot be issued until results are verified in this prospective evaluation.

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