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# A case series on the use of pessaries for shortened cervix

Jean Aileen M. Elauria-Manalastas<sup>1</sup>, Almira J. Amin-Ong<sup>1</sup>,  
Lisa T. Prodigalidad-Jabson<sup>1</sup>

## Abstract:

A cervical length <25 mm is correlated with an increased risk of preterm delivery. Pessaries have been used in patients with a short cervix to prevent preterm birth. Compared to cerclage, it is seen as a novel approach, which is more affordable, less invasive, and can be inserted at a later gestational age. We present our experience on the use of pessaries for shortened cervix. In this case series, we inserted a pessary in pregnant patients from 10 to 30 weeks of age of gestation (mean 23 weeks) with cervical length of 0.9 cm to 2.1 cm. We were able to prolong the pregnancy in 5 of the 7 cases with a mean interval to delivery of 14 weeks. One proposed mechanism of a pessary for shortened cervix is that it directs the inclination of the cervix posteriorly, which allows majority of the weight of the pregnancy to lie on the anterior segment of the uterus instead of on the internal cervical os. Based on the cases presented, we have proposed some guidelines in offering a pessary for patients with a shortened cervix: (1) recommend a pessary in patients with a cervical length <25 mm or a diagnosis of cervical insufficiency; (2) exclude infection or active labor; and (3) remove the pessary if there is rupture of membranes, significant vaginal bleeding, or persistent uterine contractions.

## Keywords:

Pessary, preterm delivery, shortened cervix

## Introduction

Preterm labor remains the leading maternal complication associated with obstetric admissions in our institution. It accounts for 1238 patients or 36% of the total obstetric admissions in 2017. Preterm birth is associated with numerous fetal complications.<sup>[1]</sup>

The use of a pessary to prevent preterm birth was first documented in 1959 by Cross using a ring pessary in 13 patients with a history of cervical lacerations, cervical incompetence, or uterus didelphys.<sup>[2]</sup> In our institution, a pessary for a short cervix was first used in 2007. We present our experience in using pessaries for cases of shortened cervix or cervical insufficiency.

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## Case Reports

Table 1 shows a list of cases referred to our section for pessary insertion for shortened cervix.

### Case 1

A 16-year-old primigravid female was admitted at 23 weeks and 5 days of age of gestation (AOG) for preterm labor. She had a case of dengue shock syndrome. Micronized progesterone 200 mg/tablet was given orally. On transvaginal ultrasound, she had a cervical length of 1.5 cm with 49% V-shaped funneling.

After 2 weeks of admission, the preterm labor was controlled and the vaginal candidiasis has resolved. Repeat ultrasound showed a cervical length of 1.9 cm with no funneling. A Hodge pessary was inserted at 26 weeks and 2 days of AOG. Repeat transvaginal scans were done at 28 weeks

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<sup>1</sup>Department of Obstetrics and Gynecology, College of Medicine and Philippine General Hospital, University of the Philippines, Manila, Philippines

### Address for correspondence:

Dr. Jean Aileen M. Elauria-Manalastas, Department of Obstetrics and Gynecology, College of Medicine and Philippine General Hospital, University of the Philippines, Taft Ave, Ermita, Manila, Philippines.  
E-mail: [jeleenelauria@gmail.com](mailto:jeleenelauria@gmail.com)

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**Table 1: Cases referred to our section for pessary insertion for shortened cervix from 2007 to 2018**

Patient	Age/OB score	OB history	AOG at pessary insertion (weeks)	CL and funneling on admission	CL and funneling at pessary insertion	Type of pessary	Pregnancy outcome	Neonatal outcome
<b>2018</b>								
KM Case 1	16/G1P0	Primigravid	26 2/7	1.5 cm 49% Y-shaped	1.9 cm No funneling	Hodge	SVD at 37 weeks	F, 2385 g PA 37 weeks AS 9, 9
ML Case 2	22/G1P0	Primigravid	30 5/7	2.1 cm 19% Y-shaped	1.6 cm 29% V-shaped	Hodge	PPROM at 30 6/7 weeks SVD at 32 4/7 weeks	F, 1745 g PA 33 weeks AS 9, 9
<b>2017</b>								
IB Case 3	42/ G2P1 (0101)	1 preterm SVD at 24-28 weeks	30 5/7	1.6 cm 27% V-shaped	2.0 cm no funneling	Hodge	CS at 40 w for dystocia	F, 3800 g PA 39 weeks AS 9, 9
MR Case 4	37/ G3P2 (0200)	2 preterm SVD at 24-28 weeks	21 5/7	0.9 cm 73% U-shaped	0.9 cm 73% U-shaped	Hodge	SVD at 22 1/7	405 g fetus Died at 15 min of life
<b>2014</b>								
RP Case 5	24/ G4P1 (0120)	1 preterm SVD at 24 weeks 2 abortions at 18-20 weeks	18 6/7	3.9 cm No funneling	3.9 cm No funneling	Arabin	SVD at 28 weeks	F, 980 g PA 29 weeks AS 5, 7
<b>2010</b>								
JA Case 6	30/ G8P7 (0700)	7 preterm SVD at 20-24 weeks	10-11	? ?	? ?	Hodge	CS at 25 5/7 weeks for bleeding placenta previa totalis	F, 1200 g PA 29 weeks AS 2, 5, 7
<b>2008</b>								
MS Case 7	35/ G2P1 (0100)	1 preterm SVD at 24 weeks	22-24	? ?	? ?	Hodge	38 6/7 weeks SVD	F, 3200 g PA 40 weeks AS 9, 9
<b>2007</b>								
BL Case 8	23/ G2P1 (0100)	1 preterm SVD	26-27	? ?	? ?	Hodge	Lost to follow up	?

AOG: Age of gestation, PA: Pediatric aging, AS: APGAR score, OB: Obstetric, PPRM: Preterm prelabor rupture of membranes, CS: Cesarean section, CL: Cervical length, SVD: spontaneous vaginal delivery

and 3 days of AOG with a cervical length of 2.3 cm with no funneling and at 32 weeks and 3 days of AOG with a cervical length of 1.4 cm with no funneling.

The patient was readmitted at 37 weeks of AOG for labor pains. The Hodge pessary was removed and she delivered vaginally a baby girl, 37 weeks by pediatric aging (PA), 2385 g, APGAR score (AS) of 9,9.

### Case 2

A 22-year-old primigravid female was admitted at 29 weeks and 4 days of AOG for preterm labor. The cervical length was 2.1 cm with 19% Y-shaped funneling. She was given nifedipine as tocolytic. On the 8<sup>th</sup> day of admission, the ultrasound showed a shortening of the cervix to 1.6 cm with 29% V-shaped funneling. A Hodge pessary was inserted at 30 weeks and 5 days. The patient continued to have contractions. The next day, the patient had rupture of membranes. The pessary was removed and the examination revealed a 2-cm dilated cervix. She delivered vaginally at

32 weeks and 3 days of AOG a baby girl, 33 weeks by PA, 1745 g, AS of 9, 9.

### Case 3

A 42-year-old gravida 2 para 1 (0101) female with a history of preterm delivery (at 24–28 weeks of AOG) was admitted at 29 weeks and 3 days of AOG for preterm labor. She was started on nifedipine and micronized progesterone. A transvaginal ultrasound showed a cervical length of 1.6 cm, 27% Y-shaped funneling. The preterm labor was controlled, and on the 8<sup>th</sup>-day of admission, the cervical length increased to 2.0 cm with no funneling. A Hodge pessary was inserted at 30 weeks of AOG and the patient was discharged. The pessary was removed at the 37<sup>th</sup> week. At 40 weeks of AOG, the patient underwent cesarean section for dysfunctional labor and delivered a live baby girl, 39 weeks by PA, 3800 g, AS of 9, 9.

### Case 4

A 37-year-old gravida 3 para 2 (0200) female with a history of two preterm deliveries at 6 months of AOG

was admitted at 21 weeks and 2 days of AOG for regular uterine contractions and cervical length of 0.9 cm with 73% U-shaped funneling. A diagnosis of cervical insufficiency was made. She was given isoxsuprine and micronized progesterone for tocolysis and miconazole/metronidazole suppository for candidiasis. On the 3<sup>rd</sup> day of admission, a Hodge pessary was inserted. Two days after, the patient had strong uterine contractions. The pessary was removed and the examination revealed a fully dilated cervix. She delivered by spontaneous breech delivery a 405-gram fetus who expired at the 15<sup>th</sup> min of life.

### Case 5

A 24-year-old gravida 4 para 1 (0120) female was admitted at 17 weeks and 5 days of AOG for progressive dyspnea. She was managed as a case of gravidocardiac secondary to atrial septal defect. She was diagnosed with cervical insufficiency because of the history of two spontaneous abortions at 18–20 weeks of AOG and one preterm delivery at 24 weeks of AOG. On admission, the cervical length was 3.9 cm with no funneling. An Arabin pessary was inserted at 18 weeks and 6 days of AOG and the patient was discharged. The cervical length at 19 weeks of AOG was 4.1 cm.

She had multiple readmissions for preterm labor. Due to persistent contractions uncontrolled by tocolytics, the pessary was removed at 28 weeks of AOG and the patient delivered by complete breech extraction a live baby girl, 29 weeks by PA, 980 g, AS of 5,7.

### Case 6

A 30-year-old gravida 8 para 7 (0700) female with 7 spontaneous preterm births at 20–24 weeks of AOG was diagnosed with cervical insufficiency. A Hodge pessary was inserted at 10–11 weeks of AOG. At 25 weeks and 5 days of AOG, she underwent cesarean section for bleeding placenta previa totalis and delivered a live baby girl, 1200 g, 29 weeks by PA, AS of 2, 5, 7.

### Case 7

A 35-year-old gravida 2 para 1 (0100) female with a history of spontaneous preterm delivery at 24 weeks of AOG was referred for pessary insertion. A Hodge pessary was inserted at 22–23 weeks of AOG. The patient delivered at 38 weeks and 6 days of AOG a live baby girl, 3200 g, 40 weeks by PA, AS of 9, 9.

### Case 8

A 23-year-old gravida 2 para 1 (0100) with a poor obstetric history for one preterm delivery was admitted at 26–27 weeks of AOG and a Hodge pessary was inserted. The patient was lost to follow-up.

## Case Discussion

The etiology of cervical shortening is unknown. The risk factors for cervical shortening include cervical insufficiency, infection, and uterine contractions.<sup>[3]</sup> Cervical shortening increases the likelihood of preterm birth.<sup>[4]</sup> A prospective multicenter study done by Iams *et al.* showed that the mean cervical length at 24 weeks of AOG is 34 mm for nulliparous women and 36 mm for multiparous women.<sup>[5]</sup> The study results showed that the relative risk of preterm delivery based on cervical length is as follows: 1.98 for cervical lengths  $\leq 40$  mm, 2.35 for  $\leq 35$  mm, 3.79 for  $\leq 30$  mm, 6.19 for  $\leq 26$  mm, 9.49 for  $\leq 22$  mm, and 13.99 for  $\leq 13$  mm. Hence, the cervical length is directly proportional with the duration of pregnancy.<sup>[4]</sup> A meta-analysis done by Berghella *et al.* in 2005 on the use of cerclage in women with short cervical length defined a short cervix as a cervical length of  $\leq 25$  mm<sup>3</sup>.

In our institution, pregnant patients with a shortened cervix ( $\leq 25$  mm) are referred for insertion of a pessary in the hopes of prolonging the pregnancy until term. Inserting a pessary is a novel approach in reducing preterm deliveries in women who have a short cervical length.<sup>[5]</sup> Compared to cerclage, a pessary is more affordable and less invasive. This study highlights our experience with the use of pessaries for shortened cervix. First, it is important to define the measurement of a successful outcome. How can we conclude that a pessary works for patients with a shortened cervix? Majority of the randomized controlled trials on pessary use for shortened cervix have focused on the rate of spontaneous preterm birth as the primary outcome.<sup>[6–9]</sup> However, one important outcome that is overlooked is the mean interval to delivery from the time of pessary insertion. This can be the focus of future prospective studies evaluating the effectiveness of pessaries for shortened cervix.

The Pesario Cervical Para Evitar Prematuridad trial done in 2012 in asymptomatic patients with a short cervix showed that the pessary significantly lowered the rates of preterm delivery compared to expectant management.<sup>[6]</sup> On the other hand, in 2016, a multicenter trial showed no significant decrease in the rate of spontaneous preterm delivery.<sup>[7]</sup> Two newer studies concluded that a pessary is not effective in reducing preterm birth in pregnancies with a shortened cervix after an episode of preterm labor.<sup>[8,9]</sup> However, looking at the secondary outcomes of this study by Pratcorona *et al.*, the mean interval to delivery was noted to be 7.4 days higher in the pessary group compared to the control group (64.7 days vs. 57.3 days,  $P = 0.01$ ).<sup>[9]</sup> Analysis of our cases showed that although preterm birth was prevented in only 3 of the 7 cases, we were

able to prolong the pregnancy in 5 cases with a mean interval to delivery of 14 weeks.

Pessaries are alternatives to cervical cerclage in cases of cervical insufficiency. Case 5 had cervical insufficiency with 3 spontaneous midtrimester births. With the pessary, the pregnancy was carried up to the early 3<sup>rd</sup> trimester. On cervical length monitoring, there was progressive cervical shortening from 4.1 cm to 19 weeks of AOG to 3.1 cm at 23 weeks and 6 days of AOG to 2.3 cm at 27 weeks and 5 days of AOG. This can be attributed to the recurrent episodes of preterm labor. Still, if the goal of the obstetrician was to prolong the pregnancy, it is deemed successful in this case.

In Case 2 and Case 4, the pessary failed in prolonging the pregnancy. Both cases had regular uterine contractions that were not controlled by tocolytics. The preterm labor progressed and the pessary had to be removed. We hypothesize that the labor might have already progressed such that the mechanism of the pessary in providing support to the surrounding tissues and retaining the cervical mucus plug will no longer work. Furthermore, in patients with active preterm labor, placement of the pessary might cause stretching of the shortened and effaced cervix, which can further stimulate uterine contractions similar to the effect of mechanical induction of labor.<sup>[8]</sup> We should, therefore, take caution in recommending cervical pessaries in patients with active preterm labor.

There are several hypothesized mechanisms, by which a cervical pessary prevents preterm birth. One proposed mechanism is that the pessary changes the inclination of the cervix and directing it more posteriorly. This allows majority of the weight of the pregnancy to lie on the anterior segment of the uterus instead of on the internal cervical os.<sup>[2]</sup> Second, the pessary protects the cervical mucus plug by preventing the opening of the internal cervical os.<sup>[2]</sup> Third, the cervical pessary decreases the Ferguson reflex, a feedback loop where pressure on the cervix stimulates oxytocin production by the pituitary gland.<sup>[2]</sup>

Dharan and Ludmir in 2009 described some basic guidelines when offering a pessary for the prevention of preterm birth which we have adapted.<sup>[10]</sup> Based on our local experience, we recommend the following guidelines.

1. Recommend a pessary in patients with a cervical length <25 mm or a diagnosis of cervical insufficiency
2. Exclude infection or active labor
3. Remove the pessary if there is rupture of membranes, significant vaginal bleeding, or persistent uterine contractions
4. Monitoring of the cervical length using transvaginal scans is recommended with the pessary in place.

## Summary

Here, we have shown the cases of shortened cervix who had pessary insertion for prolonging the pregnancy by maintaining optimum cervical length. The data show a promising outcome. Following the proposed guidelines in offering a pessary for the prevention of preterm birth may improve the success rate of this intervention. Prospective studies are also recommended to compare the use of pessaries versus expectant management in preventing preterm births in patients with a shortened cervix. It is also recommended to do serial ultrasound monitoring to document the improvement of cervical length and funneling in pregnant patients on a pessary.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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## Conflicts of interest

There are no conflicts of interest.

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