

Expert Opinion: Cerclage as a Preventive Strategy for Preterm Birth Due to Ascending Bacterial Infection (ABI)

Alfredo Ovalle S^{1,2*}

¹Service of Obstetrics, Gynecology and Neonatology, San Borja Arriarán Clinical Hospital, Santiago, Chile

²Department of Obstetrics and Gynecology, Faculty of Medicine, University of Chile, Santiago, Chile

*Corresponding author:

Alfredo Ovalle S, Service of Obstetrics, Gynecology and Neonatology, San Borja Arriarán Clinical Hospital, Santiago, Chile.

Abstract

Spontaneous preterm birth is the leading cause of global neonatal morbidity and mortality. In Chile, Ascending Bacterial Infection (ABI) is a crucial etiological factor, particularly before 34 weeks. This relationship, validated in murine models, drives the search for therapies. Therefore, cervical cerclage is considered a promising intervention, not only as a mechanical barrier but also with a potential therapeutic role against ABI.

Keywords: Cerclage, Ascending Bacterial Infection (ABI), Spontaneous preterm birth (SPTB)

Received: September 26, 2025;

Accepted: October 04, 2025;

Published: October 10, 2025

Introduction

Spontaneous preterm birth (SPTB) is the leading cause of neonatal morbidity and mortality worldwide [1-3]. In Chile, as in other low-income countries, ascending bacterial infection (ABI), associated with conditions such as bacterial vaginosis (BV), aerobic vaginitis (AV), and urinary tract infection (UTI), has been established as a primary etiological factor, especially in births occurring before 34 weeks of gestation [1,2,4]. This concept has been replicated in murine models, where ascending vaginal infection induced preterm birth and neonatal morbidity [5]. This knowledge has driven the search for preventive strategies that target the underlying cause, and in this context, cervical cerclage emerges not only as a mechanical barrier but also as a multifaceted therapeutic intervention with a promising role in preventing preterm birth due to ABI [6].

Mechanisms of Action and Scientific Evidence

The evidence gathered over the last decade has refined our understanding of cerclage, shifting from a purely mechanical view to one that integrates immune modulation and protection against bacterial virulence factors.

Evidence from Animal Models: A Biological Foundation

Research in animal models has provided a solid foundation for the hypothesis that cerclage prevents preterm birth due to ABI. Studies in mice have shown that vaginal inoculation of *Escherichia coli* induces SPTB and reduces neonatal survival [5]. Abdominal cerclage in these models not only prevented intrauterine infection but also inhibited the expression of pro-inflammatory cytokines in the uterus, placenta, and fetal membranes [7]. This finding is crucial, as it establishes a dual mechanism of action: cerclage acts as a physical barrier while simultaneously disrupting the local inflammatory response.

Modulation of Cervical Inflammation

Contrary to the conventional view, cerclage does not only act on cervical anatomy but also on its immunological microenvironment. The study by Monsanto et al. revealed that women with cervical insufficiency exhibit elevated levels of pro-inflammatory cytokines in their cervicovaginal fluid [8]. Remarkably, the placement of a cervical cerclage led to a significant decrease in these cytokines. This suggests that cerclage helps restore local

Citation: Alfredo Ovalle S (2025) Expert Opinion: Cerclage as a Preventive Strategy for Preterm Birth Due to Ascending Bacterial Infection (ABI). *J Gyne Womens Heal Care* 1: 1-2.

immune balance, reducing the inflammatory milieu that favors infection and preterm labor.

Barrier Against Bacterial Enzymatic Activity

In addition to inflammation, certain pathogens such as Group B Streptococcus (GBS)—present in one-fifth of the genitourinary samples from preterm birth cases due to ABI in the Chilean study secrete enzymes that degrade the extracellular matrix of the cervix [1]. Hyaluronidase (HylB) produced by GBS is one such enzyme, as it degrades hyaluronic acid, an essential component of cervical integrity, thereby promoting cervical shortening and dilation [9]. Studies in non-human primates have shown that GBS strains expressing HylB are more virulent and promote preterm birth by facilitating microbial invasion. Cerclage, by acting as a physical barrier, limits the ascent of these pathogens and their enzymatic activity, preserving cervical structural integrity [10].

Clinical Considerations and Type of Cerclage

Clinical evidence in humans is limited, due to the difficulty of conducting randomized studies in populations with this specific etiology. However, a Chilean study, Prophylactic cerclage in women with previous spontaneous preterm births associated with ascending bacterial infection (ABI) (2012), provides valuable evidence. Despite its small sample size (23 patients with cerclage, 28 without), its strength lies in the rigorous identification of a homogeneous population: women with a history of preterm birth due to ABI, confirmed by chorioamnionitis or placental funisitis. In this group, prophylactic cerclage performed in the first trimester reduced the frequency of preterm birth (<37 and <34 weeks) and histological chorioamnionitis [11]. This result, although preliminary, is highly suggestive and challenges the traditional view that restricts cerclage to cervical insufficiency.

Based on the above, the procedure of choice in cases with a history of preterm birth associated with ABI should be prophylactic vaginal cerclage during the first trimester to reduce the time of exposure to genitourinary infections. Allowing cervical shortening to indicate the procedure favors microbial ascent and its consequences. Transabdominal cerclage would not be justified as a first-line option in these cases, unless there is severe cervical damage or previous vaginal cerclage failure. Vaginal cerclage is less invasive and, according to the evidence, meets the therapeutic objectives: containing infection and modulating the inflammatory response. Additionally, the use of monofilament suture is preferable over multifilament suture to avoid the risk of the material serving as a nidus for infection.

Conclusion

Cervical cerclage, when applied preventively and in a targeted manner in women with a history of preterm birth due to ascending bacterial infection, represents a highly promising and well-founded strategy. Its efficacy is not limited to a mechanical

role but extends to the modulation of the local inflammatory response and protection against microbial and enzymatic invasion. This etiological and personalized view of cerclage could be fundamental in reducing the incidence of preterm birth and possibly perinatal mortality/morbidity in high-risk populations, especially in settings where genitourinary infections are prevalent. Multicenter randomized controlled trials (RCTs) are required to confirm this statement.

References

1. Ovalle A, Kakarieka, Rencoret G, Fuentes, del Río, et al. (2012) Factors associated with preterm birth between 22 and 34 weeks in a public hospital in Santiago. *Rev Med Chile* 140: 19-29.
2. Ovalle A, Kakarieka E, Díaz M, García Huidobro T, Acuña MJ, et al. (2012) Perinatal mortality in preterm birth between 22 and 34 weeks in a public hospital in Santiago, Chile. *Rev Chil Obstet Ginecol* 77: 263-70.
3. Tantengco OAG, Menon R (2022) Breaking Down the Barrier: The Role of Cervical Infection and Inflammation in Preterm Birth. *Front Glob Womens Health* 22: 777643.
4. Ovalle A, Oyarzún E (2024) Vaginal microbiota and immunological profile of pregnant women prone to preterm birth due to ascending bacterial infection. Narrative review. *Rev Chil Obstet Ginecol* 89: 164-181.
5. Boyle AK, Totorou K, Suff N, Beecroft L, Mazzaschi M, et al. (2025) Ascending Vaginal Infection in Mice Induces Preterm Birth and Neonatal Morbidity. *Am J Pathol* 195: 891-906.
6. Ovalle A, Martínez MA, Figueroa J (2019) Can preterm birth due to ascending bacterial infection and its adverse outcomes be prevented in public hospitals in Chile? *Rev Chil Infect* 36: 358-368.
7. Zhang Y, Edwards SA, House M (2023) Cerclage prevents ascending intrauterine infection in pregnant mice. *Am J Obstet Gynecol* 230: 555.
8. Monsanto SP, Daher S, Ono E (2017) Cervical cerclage placement decreases local levels of proinflammatory cytokines in patients with cervical insufficiency. *Am J Obstet Gynecol* 217: 455.e1-455.e8.
9. Vornhagen J, Quach P, Boldenow E (2016) Bacterial hyaluronidase promotes ascending GBS infection and preterm birth. *mBio* 7: e00781-16.
10. Coleman M, Armistead B, Orvis A (2021) Hyaluronidase impairs neutrophil function and promotes Group B Streptococcus invasion and preterm labor in nonhuman primates. *mBio* 12: e03115-20.
11. Ovalle A, Valderrama O, Rencoret G, Fuentes A, del Río MJ, et al. (2012) Prophylactic cerclage in women with previous spontaneous preterm births associated with ascending bacterial infection (ABI). *Rev Chil Obstet Ginecol* 77: 98-105.