

MICROBIOLOGICAL PREDICTORS OF ADVERSE PERINATAL OUTCOMES IN PREGNANCIES COMPLICATED BY ASYMPTOMATIC BACTERIURIA: IMPLICATIONS FOR EARLY RISK ASSESSMENT

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Abstract: This article examines the microbiological predictors of adverse perinatal outcomes in pregnancies complicated by asymptomatic bacteriuria. Particular attention is given to uropathogen profiles, bacterial load, antimicrobial resistance, and their potential prognostic significance. The importance of early microbiological screening and risk stratification is emphasized to support timely intervention and improve maternal and neonatal outcomes.

Keywords: asymptomatic bacteriuria, pregnancy, microbiological predictors, perinatal outcomes, uropathogens, antimicrobial resistance, risk stratification.

INTRODUCTION

Asymptomatic bacteriuria (ASB) remains a clinically significant condition during pregnancy due to its potential progression to symptomatic urinary tract infections and its association with adverse maternal and perinatal outcomes. Pregnancy-related physiological changes, including ureteral dilation, urinary stasis, and hormonal alterations, create favorable conditions for bacterial colonization and persistence within the urinary tract. Despite the absence of clinical symptoms, untreated bacteriuria may increase the risk of pyelonephritis and contribute to pregnancy-related complications. The microbiological characteristics of urinary pathogens play an important role in understanding infection progression and potential pregnancy risks. Particular attention is given to bacterial species, colony counts, antimicrobial resistance patterns, and pathogen-specific virulence factors. Although *Escherichia coli* remains the

predominant uropathogen, other microorganisms may exhibit distinct pathogenic properties and resistance profiles, potentially influencing clinical management and treatment effectiveness. Early identification of microbiological risk indicators offers opportunities to improve diagnostic accuracy and individualize preventive strategies. However, the independent predictive value of specific microbiological parameters for adverse perinatal outcomes remains insufficiently established, highlighting the need for further investigation. The aim of this study is to examine the potential prognostic significance of microbiological characteristics in pregnancies complicated by asymptomatic bacteriuria and to explore their application in early risk assessment and the prevention of adverse perinatal outcomes.

MAIN BODY

Asymptomatic bacteriuria (ASB) during pregnancy is characterized by significant bacterial growth in urine without accompanying urinary symptoms. Its clinical importance lies in the potential progression to acute pyelonephritis and its possible association with adverse perinatal outcomes. Pregnancy-related urinary stasis and hormonal changes facilitate bacterial persistence, making early microbiological assessment particularly relevant. The microbiological profile of ASB is predominantly represented by *Escherichia coli*, followed by *Klebsiella pneumoniae*, *Proteus mirabilis*, and other uropathogenic microorganisms. Differences in bacterial virulence, adhesion mechanisms, and antimicrobial susceptibility may influence infection persistence and treatment response. However, the independent contribution of individual pathogens to adverse perinatal outcomes requires further investigation. Among potential microbiological predictors, particular attention should be given to bacterial colony counts, recurrent positive urine cultures, antimicrobial resistance patterns, and pathogen-specific virulence factors. Persistent bacteriuria following treatment may indicate an increased likelihood of recurrent infection or inadequate bacterial eradication. Nevertheless, bacterial load alone cannot reliably determine the probability of obstetric complications. Adverse outcomes potentially associated with

maternal urinary infections include preterm birth, low birth weight, and neonatal complications. The relationship between ASB and these outcomes is complex and may be influenced by maternal comorbidities, gestational age, socioeconomic factors, and the timing of antimicrobial treatment. Therefore, microbiological findings should be interpreted alongside clinical and obstetric characteristics rather than as isolated prognostic indicators. Early risk assessment requires a comprehensive approach combining urine culture results, antimicrobial susceptibility testing, previous urinary infection history, and maternal risk factors. Routine screening during early pregnancy enables timely identification and treatment of ASB, while follow-up investigations may be considered according to individual clinical circumstances. The development of microbiology-based predictive models represents a promising direction in perinatal medicine. Integrating pathogen characteristics with maternal clinical data could improve the identification of high-risk pregnancies and support personalized preventive strategies. However, prospective studies and external validation are essential before such models can be implemented in routine obstetric practice.

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