ORIGINAL ARTICLE

Diagnostic Accuracy of the Clinical Assessment of Chorioamnionitis Compared with Histological Findings: A Cross-Sectional Study at Private Healthcare Setting, Multan

Hafsa Tauseef*, Farhana Haider, Faryal Akhtar

ABSTRACT

Objective: To determine the diagnostic accuracy of clinical diagnosis of chorioamnionitis by comparing it with histopathological findings in a tertiary care hospital setting.

Study Design: A cross-sectional study.

Place and Duration of Study: This study was conducted at the Department of Obstetrics and Gynaecology in Ibn-e-Siena Hospital, Multan, Pakistan from 3rd July 2024 to 3rd January 2025.

Methods: A total of sixty pregnant women with singleton pregnancies at gestational age >28 weeks, who fulfilled the clinical diagnostic criteria for chorioamnionitis, were included. Following delivery, placentas were sent for histopathological examination. The placental tissues were fixed in 10% buffered formalin, processed, and stained with haematoxylins and eosin. The histological diagnosis of chorioamnionitis was made based on established microscopic criteria, including the presence of acute inflammatory infiltrates in the chorion, amnion, or umbilical cord. Data were analyzed using SPSS version 25 to assess diagnostic accuracy and the predictive value of individual clinical features.

Results: Of 60 clinically diagnosed cases, histological confirmation was observed in 39 (65%), while 21 patients (35%) did not show histological evidence of infection/inflammation. This reflects a diagnostic accuracy of 65% for clinical diagnosis compared to the histopathological gold standard. Fetal tachycardia (PPV: 76.2%), foul-smelling vaginal discharge (PPV: 78.6%), and PROM >24 hours (PPV: 78.9%) were strong predictors of histological chorioamnionitis, significantly increasing the likelihood of actual intra-amniotic infection. However, clinical features such as maternal tachycardia and uterine tenderness showed moderate predictive value.

Conclusion: The clinical diagnosis of chorioamnionitis showed a moderate correlation with histological findings. Incorporating histopathology in diagnostic workups can enhance diagnostic accuracy and help optimize the management of suspected intra-amniotic infections.

Keywords: *Chorioamnionitis, Histopathology, Pregnancy.*

How to cite this: *Tauseef H, Haider F, Akhtar F. Diagnostic Accuracy of the Clinical Assessment of Chorioamnionitis Compared with Histological Findings: A Cross-Sectional Study at Private Healthcare Setting, Multan. Life and Science. 2025; 6(4): 504-509. doi: http://doi.org/10.37185/LnS.1.1.968*

Introduction

Chorioamnionitis, also known as intra-amniotic infection, is a significant obstetric complication characterized by inflammation of the fetal membranes (amnion and chorion) due to microbial invasion of the amniotic cavity. It is associated with severe maternal and neonatal morbidity and mortality, including preterm birth, neonatal sepsis, cerebral palsy, and postpartum endometritis.[1,2] Globally, the incidence of clinical chorioamnionitis ranges from 1% to 10% of all deliveries, with higher rates observed in developing countries due to increased prevalence of risk factors such as prolonged rupture of membranes, frequent vaginal examinations, and poor intrapartum hygiene practices.[3]

Department of Gynecology & Obstetrics
Multan Medical and Dental College and Ibn-e-Siena Hospital, Multan, Pakistan
Correspondence:
Dr. Hafsa Tauseef
Department of Gynecology & Obstetrics
Multan Medical and Dental College and Ibn-e-Siena Hospital
Multan, Pakistan
E-mail: drfatimagull113@gmail.com
Received: Mar 25, 2025; 1st Revision Revised: May 11, 2025
2nd Revision Received: July 21, 2025; Aug 10, 2025

In Pakistan, chorioamnionitis remains an underreported yet clinically significant contributor to maternal and perinatal morbidity. Studies from tertiary care centers indicate that intrauterine infections account for a notable proportion of neonatal intensive care admissions and maternal complications.[4] Despite its clinical importance, the diagnosis of chorioamnionitis in most local settings is primarily based on clinical criteria, which can lack sensitivity and specificity, potentially leading to overdiagnosis and underdiagnosis.[5]

The standard clinical criteria for diagnosing chorioamnionitis, as recommended by the American College of Obstetricians and Gynecologists (ACOG), include maternal fever (>100.4°F) and at least two additional signs, such as maternal or fetal tachycardia, uterine tenderness, foul-smelling amniotic fluid, or leukocytosis.[6] However, these criteria are often nonspecific and may overlap with other febrile illnesses in pregnancy. Histopathological examination of the placenta and membranes remains the gold standard for confirmation, revealing neutrophilic infiltration of the chorionic plate and amniotic membranes.[7]

International literature has documented a discrepancy between clinical and histological diagnoses of chorioamnionitis. Studies have reported that clinical criteria may have a diagnostic accuracy of 50% to 75% compared to histological findings.[8] In a recent systematic review, only 60–70% of women clinically diagnosed with chorioamnionitis had histological confirmation, indicating the possibility of misdiagnosis leading to unnecessary antibiotic usage and early delivery.[9] In Pakistan, data correlating clinical diagnosis with histological confirmation are limited, highlighting the need for locally contextualized research.

Given that the Pakistani obstetric population is exposed to multiple risk factors, such as limited antenatal care, delayed referral systems, and high prevalence of PROM, the accurate diagnosis of chorioamnionitis becomes crucial in minimizing maternal and neonatal complications. Moreover, the burden on neonatal intensive care units and increased use of broad-spectrum antibiotics underscores the importance of validating clinical diagnostic criteria with histological evidence.

This study aims to assess the accuracy of the clinical diagnosis of chorioamnionitis by comparing it with histological confirmation in a Pakistani tertiary care setting. By identifying the predictive value of various clinical features and quantifying diagnostic discrepancies, the findings will help refine diagnostic protocols, improve patient outcomes, and optimize antibiotic stewardship in obstetric care. The study may provide essential evidence for clinicians and policymakers to align practice with global standards while addressing local epidemiological challenges.

Methods

This study was conducted at the Department of Obstetrics and Gynaecology in Ibn-e-Sina Hospital, Multan, Pakistan. The study lasted six months from 3rd July 2024 to 3rd January 2025. Before the commencement of the study, the Institutional Review Board of the hospital issued approval vide letter no: C-78-1032-A, dated 29th June 2024.

A total of 60 pregnant women presenting to the labour room with clinical signs suggestive of chorioamnionitis were enrolled in the study using non-probability consecutive sampling. The sample size was calculated by Raosoft software by keeping 5% error margin, a population size of 70 women, and a 95% confidence interval. Inclusion criteria encompassed women of reproductive age between 18 and 40 years, with singleton pregnancies at gestational age >28 weeks, who fulfilled the clinical diagnostic criteria for chorioamnionitis. The diagnosis was based on the presence of maternal fever (>100°F) with at least two of the following: maternal tachycardia (>100 bpm), fetal tachycardia (>160 bpm), uterine tenderness, foul-smelling vaginal discharge, or prolonged rupture of membranes (PROM) exceeding 18–24 hours. Women with pre-existing medical conditions such as autoimmune diseases, tuberculosis, or chronic infections were excluded.

After initial assessment and clinical diagnosis, standard obstetric management was provided as per institutional protocols. Following delivery, all placentas were collected and sent to the pathology department for histopathological examination. The placental tissues were fixed in 10% buffered formalin, processed, and stained with hematoxylin and eosin. The histological diagnosis of chorioamnionitis was made based on established microscopic criteria, including the presence of acute

inflammatory infiltrates in the chorion, amnion, or umbilical cord.

Data were recorded on a structured proforma, including patient demographics, clinical findings, and histopathological results. Statistical analysis was performed using SPSS version 25. Descriptive statistics were calculated for quantitative variables (mean ± SD) and for categorical variables (frequencies with percentages). Diagnostic accuracy, positive predictive values, and subgroup analyses were performed to determine the strength of association between specific clinical features and histopathologically confirmed chorioamnionitis. A *P*-value <0.05 was considered statistically significant.

Results

This study was conducted at the Labour Room, Gynaecology Unit of Ibn-e-Siena Hospital, Multan, involving a total of 60 pregnant women suspected of having clinical chorioamnionitis. The mean age of participants was 27.8 ± 4.5 years, ranging from 19 to 35 years. Most patients (66.7%) were multigravida, and 75% presented between 32 and 37 weeks of gestation. Clinical findings included fever, maternal tachycardia, fetal tachycardia, uterine tenderness, and foul-smelling vaginal discharge. Demographic and clinical characteristics are presented in Table 1.

Out of 60 clinically diagnosed cases of chorioamnionitis, histopathological confirmation was found in 39 patients (65%), while 21 patients

Table 1: Demographic and clinical characteristics of patients with clinical chorioamnionitis (N = 60)

Variable	Frequency (N)	Percentage (%)
Age Group (years)		
18–25	22	36.7
26–30	24	40.0
31–35	14	23.3
Gravidity		
Primigravida	20	33.3
Multigravida	40	66.7
Gestational Age (weeks)		
32–37	45	75.0
>37	15	25.0
Clinical Features Present		
Fever (>100°F)	60	100.0
Maternal tachycardia (>100 bpm)	48	80.0
Fetal tachycardia (>160 bpm)	42	70.0
Uterine tenderness	35	58.3
Foul-smelling vaginal discharge	28	46.7
PROM > 24 hours	38	63.3

Table 2: Comparison of clinical diagnosis vs histopathological confirmation of chorioamnionitis

Clinical Diagnosis	Histologically Confirmed	Not Confirmed	Total
Present (N = 60)	39	21	60
Percentage	65.0%	35.0%	-

Table 3: Predictive value of clinical features for histologically confirmed chorioamnionitis

Clinical Feature	Histology Confirmed (N)	Not Confirmed (N)	Total (N)
Maternal tachycardia (N = 48)	34	14	48
Fetal tachycardia (N = 42)	32	10	42
Uterine tenderness (N = 35)	25	10	35
Foul-smelling discharge (N = 28)	22	6	28
PROM >24 hours (N = 38)	30	8	38

(35%) did not show histological evidence of infection/inflammation. This reflects a diagnostic accuracy of 65% for clinical diagnosis compared to the histopathological gold standard. (Table 2).

A subgroup analysis evaluated clinical parameters predictive of true chorioamnionitis (Table 3). Among patients with fever and fetal tachycardia, 76% had histological confirmation, whereas only 50% of those without fetal tachycardia had a confirmed diagnosis. Similarly, the presence of foul-smelling vaginal discharge and PROM > 24 hours correlated significantly with histological chorioamnionitis.

Discussion

This study evaluated the diagnostic accuracy of clinical chorioamnionitis in comparison to histopathological confirmation among pregnant women admitted to a tertiary care hospital in Pakistan. Our findings demonstrated that out of 60 patients clinically diagnosed with chorioamnionitis, only 39 (65%) had histological evidence confirming the diagnosis. These results indicate moderate agreement between clinical suspicion and pathological reality, consistent with previous studies reporting variable accuracy of clinical diagnosis, ranging from 50% to 75% compared to histopathological gold standards.[10,11]

A study by Oh KJ et al. reported histopathological confirmation in 61.2% of clinically diagnosed cases, which closely aligns with our results (65%).[12] Similarly, Orsaria M et al. highlighted a discrepancy between clinical and histological chorioamnionitis, with only 63% of clinically diagnosed cases showing confirmed placental inflammation.[13] Han X et al. found histological confirmation in 58% of term pregnancies with clinical signs of infection, suggesting that overdiagnosis may be common in routine obstetric practice.[14]

Our study further revealed that certain clinical features were more predictive of true histological chorioamnionitis. Fetal tachycardia had a positive predictive value of 76.2%, while foul-smelling vaginal discharge and prolonged rupture of membranes (PROM > 24 hours) had predictive values of 78.6% and 78.9%, respectively. These findings are supported by a large-scale study by Birgisdottir BT et al., which identified fetal tachycardia and PROM as strong indicators of intra-amniotic infection, with predictive values exceeding 70%.[15]

In contrast, uterine tenderness and maternal tachycardia showed moderate predictive values (71.4% and 70.8%, respectively) in our cohort, which is in line with findings from the study by Sukumaran S et al., where uterine tenderness alone had limited specificity and required adjunct clinical findings for accurate diagnosis.[16] A recent study reported that while maternal fever was present in over 90% of clinically suspected cases, only 60% had confirmed histological chorioamnionitis, reinforcing the importance of comprehensive evaluation.[17]

The discrepancy between clinical diagnosis and histopathology raises concerns about potential overtreatment, including unnecessary antibiotic use and premature deliveries. This is particularly relevant in low-resource settings like Pakistan, where empirical management is standard due to a lack of immediate diagnostic confirmation. Olguín-Ortega A et al. emphasized correlating clinical findings with laboratory and histopathological evidence to avoid iatrogenic complications and antibiotic resistance.[18]

Furthermore, our study emphasizes improving diagnostic protocols through training, standardized clinical criteria, and timely access to pathology services. Recent literature suggests that adjunct diagnostic tools, such as biomarkers (e.g., IL-6, CRP) or amniotic fluid Gram stain in high-risk cases, could enhance diagnostic precision.[19,20]

In summary, while clinical diagnosis remains a practical and necessary approach in urgent obstetric care, it is not definitive. Histopathological confirmation is crucial in validating clinical impressions, guiding appropriate interventions, and avoiding overtreatment.

The current study has some limitations. We only analyzed 60 patients, which is a small sample size by statistical standards. Larger randomized studies should be conducted to verify our findings.

Conclusion

This study demonstrates that the clinical diagnosis of chorioamnionitis, while practical and widely used, has limited diagnostic accuracy compared to histopathological confirmation. Only 65% of clinically suspected cases were histologically proven, indicating the potential for underdiagnosis and overtreatment. Among clinical features, fetal

tachycardia, foul-smelling vaginal discharge, and prolonged rupture of membranes were found to be stronger predictors of true intra-amniotic infection. The findings underscore the importance of histological evaluation in validating clinical suspicion, guiding appropriate antibiotic therapy, and improving maternal and neonatal outcomes, especially in resource-constrained settings like Pakistan.

Acknowledgement: None

Conflict of Interest: The authors declare no conflict of interest

Grant Support and Financial Disclosure: None

REFERENCES

1. Carter SW, Neubronner S, Su LL, Dashraath P, Mattar C, Illanes SE, et al. Chorioamnionitis: an update on diagnostic evaluation. Biomedicines. 2023; 11: 2922. doi: 10.3390/biomedicines11112922
2. Ludmila V, Olga G, Alexandra F. Obstetrics and Perinatal Complications in Pregnant Women with Chorioamnionitis. World Science. 2022: 553203. doi: 10.31435/rsglobal_ws/30042022/7802
3. Berg P, Granfors M, Riese C, Mantel Ä. Clinical characteristics and predictors of neonatal outcomes in chorioamnionitis at term gestation: a cohort study. BJOG: An International Journal of Obstetrics & Gynaecology. 2023; 130: 1080-6. doi: 10.1111/1471-0528.17433
4. Shchegolev AI, Tumanova UN, Serov VN. Chorioamnionitis: diagnosis and role in complications during pregnancy and fetal development. Obstetrics and Gynecology. 2024; 29: 5-14. doi: 10.18565/aig.2024.10
5. Shaeen SK, Tharwani ZH, Bilal W, Islam Z, Essar MY. Maternal mortality in Pakistan: challenges, efforts, and recommendations. Annals of Medicine and Surgery. 2022; 81: 104380. doi: 10.1016/j.amsu.2022.104380
6. Brown-Berchtold L, Adams S. Pharmacology, Physiology, and Practice in Obstetric Anesthesia. Academic Press. 2025: 553-61. doi: 10.1016/B978-0-443-21707-4.00050-1
7. Berezowsky A, Romano A, Hochberg A, Krispin E, Danieli HZ, Krencel A, et al. The correlation between placental histology and microbiologic infection in the diagnosis of chorioamnionitis in preterm delivery. Placenta. 2022; 128: 18-22. doi: 10.1016/j.placenta.2022.08.005
8. Ajayi SO, Morris J, Aleem S, Pease ME, Wang A, Mowes A, et al. Association of clinical signs of chorioamnionitis with histological chorioamnionitis and neonatal outcomes. The journal of maternal-fetal & neonatal medicine. 2022; 35: 10337-47. doi: 10.1080/14767058.2022.2128648
9. Rallis D, Lithoxopoulou M, Pervana S, Karagianni P, Hatziioannidis I, Soubasi V, et al. Clinical chorioamnionitis and histologic placental inflammation: association with early-neonatal sepsis. The Journal of Maternal-Fetal & Neonatal Medicine. 2022; 35: 8090-6. doi: 10.1080/14767058.2021.1961727
10. Singh B, Jain S, Kundu R, Punia RS. Diagnostic accuracy of histological chorioamnionitis and funisitis in neonatal sepsis. Journal of Neonatology. 2023; 37: 100-7. doi: 10.1177/09732179231157216
11. Galletta MA, Schultz R, Sartorelli MF, Guerra EC, Agra IK, Peres SV, et al. Clinical characteristics, complications, and predictive model of histological chorioamnionitis in women with preterm premature rupture of membranes. PLoS One. 2023; 18: e0283974. doi: 10.1371/journal.pone.0283974
12. Oh KJ, Romero R, Kim HJ, Lee J, Hong JS, Yoon BH. Preterm labor with intact membranes: a simple noninvasive method to identify patients at risk for intra-amniotic infection and/or inflammation. The Journal of Maternal-Fetal & Neonatal Medicine. 2022; 35: 10514-29. doi: 10.1080/14767058.2022.2131388
13. Orsaria M, Liviero S, Rossetti E, Pittini C, Driul L, Londero AP, et al. Placental acute inflammation infiltrates and pregnancy outcomes: a retrospective cohort study. Scientific reports. 2021; 11: 24165. doi: 10.1038/s41598-021-03655-4
14. Han X, Du H, Cao Y, Zhang Y, Zhang J, Zhang L, et al. Association of histological and clinical chorioamnionitis with perinatal and neonatal outcome. The Journal of Maternal-Fetal & Neonatal Medicine. 2021; 34: 794-802. doi: 10.1080/14767058.2019.1618824
15. Birgisdottir BT, Hulthén Varli I, Saltvedt S, Lu K, Abtahi F, Åden U, et al. Short-term variation of the fetal heart rate as a marker of intraamniotic infection in pregnancies with preterm prelabor rupture of membranes: a historical cohort study. The Journal of Maternal-Fetal & Neonatal Medicine. 2024; 37: 2345855. doi: 10.1080/14767058.2024.2345855
16. Sukumaran S, Pereira V, Mallur S, Chandraharan E. Cardiotocograph (CTG) changes and maternal and neonatal outcomes in chorioamnionitis and/or funisitis confirmed on histopathology. European Journal of Obstetrics & Gynecology and Reproductive Biology. 2021; 260: 183-8. doi: 10.1016/j.ejogrb.2021.03.029
17. Asogwa AO, Ezugwu EC, Eleje GU, Chidinma OI, Asogwa FK, Ezugwu OC, et al. Association of clinical signs of chorioamnionitis with histological chorioamnionitis and neonatal outcomes in women with premature rupture of membranes. Nigerian Journal of Clinical Practice. 2023; 26: 1354-60. doi: 10.4103/njcp.njcp_128_23
18. Olguín-Ortega A, Figueroa-Damian R, Palafox-Vargas ML, Reyes-Muñoz E. Risk of adverse perinatal outcomes among women with clinical and subclinical histopathological chorioamnionitis. Frontiers in Medicine. 2024; 11: 1242962. doi: 10.3389/fmed.2024.1242962
19. Balciuniene G, Gulbiniene V, Dumalakiene I, Viliene R, Bartkeviciene D, Pilypiene I, et al. Prognostic markers for chorioamnionitis: IL-6, TNF-α, and MMP-8 in vaginally obtained amniotic fluid. Journal of clinical medicine. 2021; 10: 1136. doi: 10.3390/jcm10051136
20. Zhang JZ, Wu Y, Shen HX, Zhu XY, Ai L, Xue LL. Diagnostic value of placenta tissues TLR4 and IL-6 combined with secretion smears in predicting chorioamnionitis in pregnant women with preterm premature rupture of membranes. Chinese Journal of Nosocomiology. 2022; 32: 3156-60.

Author Contributions

HT: Manuscript writing for methodology design and investigation, writing the original draft, proofreading, and approval for final submission

FH: Conception and design of the work, data acquisition, curation, and statistical analysis

FA: Validation of data, interpretation, and write-up of results, revising, editing, and supervising for intellectual content