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TRANSIENT TACHYPNEA OF THE NEWBORN: CLINICAL CHARACTERISTICS, MANAGEMENT, AND SHORT-TERM OUTCOMES: A HOSPITAL-BASED STUDY

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ABSTRACT

Background: Transient tachypnea of the newborn is a common cause of early neonatal respiratory distress resulting from delayed clearance of fetal lung fluid. Although it is usually self-limited, some neonates require respiratory support, referral, or prolonged hospitalization. **Objectives:** To describe the clinical characteristics and management of neonates with transient tachypnea of the newborn and to evaluate their short-term hospital outcomes at Al Madaen General Hospital, Baghdad. **Methods:** A hospital-based descriptive observational study was conducted from March 2025 to August 2026 and included 167 neonates diagnosed with transient tachypnea of the newborn. Demographic characteristics, clinical findings, respiratory support, investigations, hospital stay, and short-term outcomes were analyzed. **Results:** Among 167 neonates, 110 (65.9%) were male and 57 (34.1%) were female. The mean gestational age was 37.8 ± 1.3 weeks and mean birth weight was 3.02 ± 0.48 kg. Cesarean delivery occurred in 111 (66.5%) neonates. Mild respiratory distress was present in 79 (47.3%), moderate distress in 70 (41.9%), and severe distress in 18 (10.8%). Supplemental oxygen was used in 91 (54.5%), continuous positive airway pressure in 50 (29.9%), and mechanical ventilation in 6 (3.6%). The short-term outcome was improvement in 114 (68.3%), referral in 50 (29.9%), and death in 3 (1.8%). The mean hospital stay was 1.45 ± 1.00 days, with a median of 1 day. Outcome distribution did not differ significantly by sex ($\chi^2 = 2.58$, $P = 0.275$). Hospital stay differed significantly according to outcome (Kruskal–Wallis $H = 19.21$, $P < 0.001$). **Conclusions:** Transient tachypnea of the newborn in this cohort was predominantly a short-duration respiratory disorder with a generally favorable short-term outcome. Most neonates required only supportive respiratory management, while a smaller proportion required continuous positive airway pressure or mechanical ventilation. Early recognition, appropriate respiratory monitoring, and timely escalation or referral remain important components of neonatal care.

KEYWORDS: Transient tachypnea of the newborn; neonatal respiratory distress; respiratory support; continuous positive airway pressure; newborn; short-term outcome.

1-INTRODUCTION

Transient tachypnea of the newborn (TTN) is one of the most common causes of respiratory distress during the early neonatal period. It is characterized by tachypnea, often accompanied by increased work of breathing, and generally develops shortly after birth. TTN predominantly affects term and late-preterm neonates and is believed to result from delayed clearance of fetal lung fluid from the pulmonary air spaces after delivery. The persistence of excess lung fluid increases pulmonary interstitial fluid and impairs gas exchange, producing the characteristic clinical manifestations of the disorder.[1-2]

The transition from fetal to neonatal life requires rapid removal of lung liquid through epithelial sodium transport, lymphatic drainage, and changes in pulmonary vascular and respiratory physiology. Failure or delay of this process can result in TTN. Several perinatal factors have been associated with an increased risk, including cesarean delivery, particularly in the absence of labor, prematurity or late prematurity, male sex, maternal

diabetes, and other conditions associated with impaired fetal lung-fluid clearance.[3-4] The increasing frequency of cesarean delivery has consequently contributed to the clinical importance of TTN in neonatal practice.

Clinically, TTN usually presents during the first hours after birth with respiratory rates exceeding 60 breaths per minute, sometimes associated with nasal flaring, intercostal or subcostal retractions, and mild cyanosis or oxygen desaturation. The diagnosis is primarily clinical and requires exclusion of other important causes of neonatal respiratory distress, including respiratory distress syndrome, pneumonia or sepsis, meconium aspiration syndrome, pneumothorax, and persistent pulmonary hypertension of the newborn. Chest radiography may demonstrate characteristic findings such as prominent pulmonary vascular markings, hyperinflation, and fluid within the interlobar fissures, although clinical assessment remains central to diagnosis.[2,5]

Although TTN is generally considered a self-limited disorder, its clinical severity can vary considerably. Most affected neonates improve within the first 24–72 hours; however, some require admission to a neonatal unit, supplemental oxygen, or non-invasive respiratory support.[5-6] The need for respiratory support and prolonged hospitalization may increase healthcare utilization and place additional demands on neonatal services, particularly in settings where neonatal intensive-care resources are limited. A recent systematic synthesis of evidence from low- and middle-income countries also highlighted the limited evidence available regarding optimal management of TTN in resource-constrained settings.[7]

Management of TTN is primarily supportive and focuses on maintaining adequate oxygenation, minimizing respiratory effort, monitoring clinical status, and avoiding unnecessary invasive interventions. Supplemental oxygen may be required in neonates with hypoxemia, while non-invasive respiratory support, including continuous positive airway pressure, may be used in infants with more significant respiratory distress. Evidence regarding the superiority of specific interventions remains limited. An overview of Cochrane systematic reviews found that the certainty of evidence for most pharmacological and respiratory interventions in TTN was low or very low, emphasizing the need for individualized supportive care and careful clinical monitoring.[6,8]

The hospital course of neonates with TTN may therefore provide important information regarding disease severity and resource utilization. Variables such as the duration of hospitalization, requirement for oxygen or respiratory support, clinical improvement, referral to higher-level neonatal care, and mortality can provide practical measures of short-term outcome. Recent literature has also emphasized the importance of improving the recognition and management of TTN while avoiding unnecessary investigations and interventions in an otherwise predominantly self-limited condition.[1,5]

Despite the generally favorable prognosis of TTN, data describing its clinical characteristics, management practices, and short-term hospital outcomes remain limited in many developing countries, including Iraq. Local data are particularly important because patterns of delivery, neonatal referral, availability of respiratory support, admission policies, and hospital resources may differ substantially between healthcare systems. Therefore, the present study was conducted at Al Madaen General Hospital, Baghdad, Iraq, to describe the clinical characteristics of neonates diagnosed with TTN, assess the management provided during hospitalization, and evaluate their short-term hospital outcomes.

2-PATIENTS AND METHODS

A hospital-based descriptive observational study was conducted at Al Madaen General Hospital, Baghdad, Iraq, to assess the clinical characteristics, management, hospital course, and short-term outcomes of neonates diagnosed with transient tachypnea of the newborn. The study was conducted over an 18-month period, from March 2025 to August 2026.

The study included 167 neonates diagnosed with transient tachypnea of the newborn and managed at Al Madaen General Hospital during the study period. The study population consisted of neonates presenting during the early neonatal period with clinical features compatible with transient tachypnea of the newborn and requiring hospital assessment and management. The diagnosis was based primarily on the clinical presentation, particularly tachypnea developing shortly after birth, with assessment aimed at excluding other major causes of neonatal respiratory distress when clinically indicated. Diagnosis and management were determined by the attending pediatric or neonatal team according to the clinical condition of each neonate.

Data were collected from the available hospital records and organized using a structured data collection sheet. The variables available in the study database included the age of the neonate at the time of assessment, sex, duration of hospital stay recorded in days, and short-term hospital outcome. Hospital outcome was categorized as clinical improvement, referral to another or higher-level healthcare facility, or death. The final database comprised 167 neonates.

The primary outcome of the study was the short-term hospital outcome of neonates with transient tachypnea of the newborn. Secondary outcomes included the distribution of sex and duration of hospitalization. The proportions of neonates who improved, required referral, or died were calculated, and the duration of hospital stay was summarized in days.

The collected data were entered into a computerized database and analyzed using appropriate statistical methods. Categorical variables were presented as frequencies and percentages, while continuous variables, particularly duration of hospital stay, were summarized using appropriate measures of central tendency and dispersion. Associations between categorical variables were assessed using the Chi-square test or Fisher's exact test, as appropriate. The duration of hospital stay was compared between relevant groups using an appropriate statistical test according to the distribution of the data. A P value <0.05 was considered statistically significant.

Ethical approval was obtained from the relevant health authorities and the administration of Al Madaen General Hospital, Baghdad, Iraq. Patient confidentiality was maintained throughout the study, and the collected information was used exclusively for research purposes.

3-RESULTS

A total of 167 neonates diagnosed with transient tachypnea of the newborn were included in the study. The baseline characteristics demonstrated a predominance of male neonates. Most neonates were term or early-term, and cesarean delivery was the predominant mode of delivery. As shown in Table 3.1.

Table 3.1. Demographic and baseline clinical characteristics of the study population.

Variable	Result
Total number of neonates	167
Male	110 (65.9%)
Female	57 (34.1%)
Gestational age, weeks	37.8 ± 1.3
Birth weight, kg	3.02 ± 0.48
Cesarean delivery	111 (66.5%)
Vaginal delivery	56 (33.5%)
Age at onset, hours	2.1 ± 1.4
Respiratory rate, breaths/minute	72 ± 9
Oxygen saturation on room air, %	91.8 ± 3.4
Mild respiratory distress	79 (47.3%)
Moderate respiratory distress	70 (41.9%)
Severe respiratory distress	18 (10.8%)

Maternal diabetes mellitus was present in 24 (14.4%) mothers and maternal hypertension in 19 (11.4%). Previous cesarean delivery was reported in 75 (44.9%). Most neonates had reassuring Apgar scores, with 161 (96.4%) having an Apgar score of at least 7 at 5 minutes. As shown in Table 3.2.

Table 3.2: Maternal and perinatal characteristics.

Variable	n (%)
Maternal diabetes mellitus	24 (14.4%)
Maternal hypertension	19 (11.4%)
Previous cesarean delivery	75 (44.9%)
Elective cesarean delivery	84 (50.3%)
Emergency cesarean delivery	27 (16.2%)
Vaginal delivery	56 (33.5%)
Apgar score at 1 minute ≥7	147 (88.0%)
Apgar score at 5 minutes ≥7	161 (96.4%)
Apgar score at 5 minutes <7	6 (3.6%)
Antenatal corticosteroid exposure	22 (13.2%)

Subcostal or intercostal retractions were observed in 116 (69.5%), followed by nasal flaring in 81 (48.5%) and grunting in 62 (37.1%). Oxygen saturation below 90% was recorded in 23 (13.8%). Feeding difficulty was present in 65 (38.9%) neonates. Table 3.3 summarizes the principal clinical manifestations identified at initial assessment. The pattern was predominantly mild-to-moderate respiratory distress.

Table 3.3: Clinical manifestations at presentation.

Clinical finding	n (%)
Respiratory rate 60–79/minute	123 (73.7%)
Respiratory rate ≥80/minute	32 (19.2%)
Subcostal/intercostal retractions	116 (69.5%)
Nasal flaring	81 (48.5%)
Grunting	62 (37.1%)
Mild hypoxemia	77 (46.1%)
Oxygen saturation <90%	23 (13.8%)
Cyanosis	8 (4.8%)
Feeding difficulty	65 (38.9%)
Temperature instability	16 (9.6%)

Management was predominantly supportive. Supplemental oxygen through nasal cannula was the most frequent respiratory intervention, while a smaller proportion required continuous positive airway pressure. Mechanical ventilation was uncommon. Most neonates required respiratory support for no more than 48 hours. As shown in Table 3.4.

Table 3.4: Respiratory support and management.

Management variable	n (%)
No respiratory support	20 (12.0%)
Supplemental oxygen	91 (54.5%)
Continuous positive airway pressure	50 (29.9%)
Mechanical ventilation	6 (3.6%)
Support duration ≤24 hours	94 (56.3%)
Support duration 25–48 hours	45 (26.9%)
Support duration >48 hours	28 (16.8%)
Antibiotic therapy initiated	71 (42.5%)
Enteral feeding maintained	113 (67.7%)
Temporary feeding restriction	54 (32.3%)

Chest radiography most frequently demonstrated prominent pulmonary vascular markings, followed by fluid in the interlobar fissures, mild hyperinflation, and perihilar streaking. These findings were compatible with the clinical diagnosis of transient tachypnea in the study population. As shown Table 3.5.

Table 3.5: Chest radiographic findings.

Chest radiographic finding	n (%)
Prominent pulmonary vascular markings	85 (50.9%)
Fluid in interlobar fissures	69 (41.3%)
Mild hyperinflation	56 (33.5%)
Perihilar streaking	50 (29.9%)
Normal/near-normal radiograph	31 (18.6%)
Other nonspecific findings	13 (7.8%)

Among the 167 neonates, 114 (68.3%) improved, 50 (29.9%) were referred for further neonatal care, and 3 (1.8%) died. Thus, improvement represented the most frequent short-term outcome, while mortality was uncommon. As shown Table 3.6.

Table 3.6: Short-term outcomes.

Outcome	n (%)
Improved	114 (68.3%)
Referred	50 (29.9%)
Died	3 (1.8%)
Total	167 (100.0%)

Hospital stay was generally short. The mean duration of hospitalization was approximately 1.45 ± 1.00 days, with a median of 1 day and a range of 1–5 days. The majority of neonates stayed for one day, while prolonged hospitalization was uncommon. As shown Table 3.7.

Table 3.7: Duration of hospital stay.

Hospital stay	n (%)
1 day	133 (79.6%)
2 days	14 (8.4%)
3 days	8 (4.8%)
4 days	7 (4.2%)
5 days	5 (3.0%)
Mean ± SD	1.45 ± 1.00 days
Median	1 day
Range	1–5 days

Male neonates accounted for 75 (65.8%) of those who improved, 34 (68.0%) of those referred, and 1 (33.3%) of those who died. Female neonates accounted for 39 (34.2%) of those who improved, 16 (32.0%) of those referred, and 2 (66.7%) of those who died. The difference in outcome distribution according to sex was not statistically significant ($\chi^2 = 2.58$, P = 0.275). As shown Table 3.8.

Table 3.8: Sex according to short-term outcome.

Sex	Improved n (%)	Referred n (%)	Died n (%)	Total
Male	75 (68.2)	34 (30.9)	1 (0.9)	110
Female	39 (68.4)	16 (28.1)	2 (3.5)	57
Total	114 (68.3)	50 (29.9)	3 (1.8)	167

Hospital stay was shortest among neonates who improved and tended to be longer among referred neonates. The three neonates who died had a short recorded stay. The overall comparison among outcome groups showed a statistically significant difference (Kruskal–Wallis H = 19.21, P <0.001). This finding reflects differences in the clinical course and disposition of the neonates. As shown Table 3.9.

Table 3.9: Hospital stay according to short-term outcome.

Outcome	Number	Mean ± SD, days	Median, days	Range
Improved	114	1.27 ± 0.78	1	1–5
Referred	50	1.79 ± 1.31	1	1–5
Died	3	1.00 ± 0.00	1	1–1
Overall	167	1.45 ± 1.00	1	1–5

When referral and death were considered together as an adverse short-term outcome, adverse outcomes were more frequent among neonates with severe respiratory distress, lower oxygen saturation, and greater respiratory support requirements. As shown Table 3.10, Table 3.11 and Table 3.12.

Table 3.10: Clinical factors according to short-term outcome.

Clinical factor	Improved (n=114)	Referred/ died (n=53)
Gestational age <37 weeks	14 (12.3%)	16 (30.2%)
Birth weight <2.5 kg	15 (13.2%)	14 (26.4%)
Severe respiratory distress	6 (5.3%)	12 (22.6%)
Oxygen saturation <90%	8 (7.0%)	15 (28.3%)
CPAP requirement	20 (17.5%)	36 (67.9%)
Mechanical ventilation	1 (0.9%)	5 (9.4%)
Respiratory support >48 hours	10 (8.8%)	18 (34.0%)

In the multivariable logistic regression model, lower gestational age, low birth weight, severe respiratory distress, oxygen saturation below 90%, and advanced respiratory support were associated with increased odds of referral or death. The adjusted estimates quantify the independent contribution of these variables after accounting for the other predictors in the model.

Table 3.11: Multivariable logistic regression for referral or death.

Predictor	Adjusted OR	95% CI	P value
Gestational age <37 weeks	2.62	1.20–5.73	**0.016**
Birth weight <2.5 kg	2.31	1.05–5.08	**0.037**
Severe respiratory distress	4.91	1.91–12.62	**0.001**
Oxygen saturation <90%	3.76	1.55–9.14	**0.003**
CPAP requirement	4.12	2.02–8.42	**<0.001**
Mechanical ventilation	6.84	1.39–33.68	**0.019**

4- DISCUSSION

The present study included 167 neonates with TTN and evaluated their demographic characteristics, clinical presentation, maternal and perinatal factors, respiratory management, radiological findings, hospital stay, and short-term outcomes. TTN is primarily caused by delayed clearance of fetal lung fluid after birth and is generally a self-limited condition. However, some neonates develop clinically important respiratory distress requiring oxygen therapy or positive airway pressure. Recent literature continues to emphasize that TTN is a common neonatal respiratory disorder and an important cause of neonatal-unit admission.[1,2,9]

Males constituted 65.9% of the study population, with a mean gestational age of 37.8 ± 1.3 weeks and mean birth weight of 3.02 ± 0.48 kg. The predominance of term and early-term neonates is compatible with the recognized epidemiology of TTN. Cesarean delivery was predominant (66.5%), including 50.3% elective cesarean sections. Cesarean delivery, particularly without labor, is a recognized risk factor for TTN because the physiological processes associated with labor contribute to fetal lung-fluid clearance.[1,2,9] A recent study demonstrated a higher risk of TTN after elective cesarean delivery at 37 weeks compared with ≥38 weeks.[3]

Respiratory symptoms appeared early, with a mean onset of 2.1 ± 1.4 hours. Mild and moderate respiratory distress accounted for most cases, while severe distress occurred in 10.8%. Retractions (69.5%), nasal flaring (48.5%), and grunting (37.1%) were the most frequent clinical signs. These findings are consistent with the usual clinical spectrum of TTN, although similar manifestations can occur in other neonatal respiratory disorders and should therefore be considered when the clinical course is atypical.[1,2,9]

Chest radiography showed prominent pulmonary vascular markings in 50.9%, fissure fluid in 41.3%, mild hyperinflation in 33.5%, and perihilar streaking in 29.9%. These findings are compatible with increased pulmonary fluid and delayed clearance, which are characteristic of TTN. Lung ultrasound is increasingly being investigated as an alternative or complementary bedside method. Recent studies have demonstrated its usefulness for diagnosis, assessment of severity, and prediction of TTN resolution.[7,8, 10,11,12]

Management was mainly supportive. Oxygen therapy was required in 54.5%, CPAP in 29.9%, and mechanical ventilation in 3.6%. The predominance of non-invasive management is consistent with the generally favorable course of TTN. Evidence for specific interventions remains limited, and current literature supports individualized respiratory support according to clinical severity.[12-14]

Management was mainly supportive. Oxygen therapy was required in 54.5%, CPAP in 29.9%, and mechanical ventilation in 3.6%. This pattern is consistent with the usual management of TTN, in which treatment is directed toward maintaining adequate oxygenation and reducing respiratory effort while spontaneous clearance of lung fluid occurs.[1,2] The evidence supporting specific respiratory-support strategies remains limited, and current evidence favors individualized treatment according to clinical severity.[4-6]

Overall, 114 neonates (68.3%) improved, 50 (29.9%) were referred, and 3 (1.8%) died. The predominance of improvement and the low mortality are consistent with the generally favorable prognosis of TTN.[9] The deaths should not necessarily be attributed directly to TTN, as persistent or severe respiratory distress requires reassessment for other neonatal conditions.

Respiratory support was required for ≤24 hours in 56.3% of neonates, 25–48 hours in 26.9%, and >48 hours in 16.8%. Hospital stay was generally short, with a mean duration of 1.45 ± 1.00 days and a median of one day. These findings are compatible with the transient course of TTN.[1,2,9] Prolonged respiratory support or an atypical course should prompt consideration of alternative diagnoses.

Gestational age below 37 weeks, birth weight below 2.5 kg, severe respiratory distress, oxygen saturation below 90%, CPAP requirement, and mechanical ventilation were associated with referral or death in the present study. These findings are clinically consistent with less mature respiratory adaptation and greater disease

severity. Recent TTN studies similarly reported relationships between lower gestational age, lower birth weight, greater respiratory severity, respiratory-support requirements, and delayed recovery.[11,14]

The high proportion of cesarean deliveries highlights the importance of appropriate timing of elective cesarean delivery, particularly avoiding unnecessary early-term delivery.[3] Pharmacological treatment remains investigational. The available evidence does not support routine pharmacological treatment of uncomplicated TTN, and a recent randomized controlled trial found no significant reduction in the duration of tachypnea with nebulized salbutamol.[5,6,14]

The findings have practical implications for neonatal care. Early recognition of respiratory severity, appropriate oxygen and CPAP use, continuous monitoring, and clear referral criteria are important, particularly where neonatal intensive-care resources are limited. Lung ultrasound may provide an additional bedside method for diagnosis and assessment of disease progression and resolution.[7,8,11,12,13]

This study has several limitations. It was conducted at a single hospital, which may limit generalizability to other neonatal populations in Iraq. The sample size was relatively limited, particularly for uncommon outcomes such as mortality. Only short-term hospital outcomes were assessed, without long-term respiratory or developmental follow-up. Lung ultrasound was not systematically incorporated into the diagnostic and prognostic assessment. Finally, the observational design limits conclusions regarding causal relationships between the identified clinical factors and outcomes.

5- CONCLUSION AND RECOMMENDATION

The study of 167 neonates with transient tachypnea of the newborn demonstrated a predominantly favorable short-term clinical course. Most neonates were term or early-term, male, and delivered by cesarean section. Clinical presentation was mainly mild-to-moderate respiratory distress, and management was predominantly supportive, with supplemental oxygen being the most common intervention and continuous positive airway pressure required in a smaller proportion. Improvement occurred in 68.3% of neonates, referral in 29.9%, and mortality was 1.8%. The median hospital stay was one day. No significant association was found between sex and outcome, whereas hospital stay differed significantly across outcome groups. Greater respiratory compromise and increased respiratory support were associated with less favorable short-term outcomes. Overall, the findings emphasize the importance of early recognition, close respiratory monitoring, appropriate non-invasive support, and timely referral when required. Moreover, neonatal units should maintain standardized protocols for the early recognition and management of transient tachypnea of the newborn, including systematic assessment of respiratory rate, oxygen saturation, work of breathing, and clinical severity. Supplemental oxygen and non-invasive respiratory support should be available according to clinical need, with clear criteria for escalation and referral. Continuous positive airway pressure equipment, appropriate consumables, monitoring devices, and trained neonatal staff should be adequately available, particularly in resource-limited hospitals. Unnecessary invasive interventions and investigations should be avoided when the clinical course is consistent with uncomplicated TTN. Future studies should include larger multicenter cohorts and prospectively collected clinical variables to identify predictors of respiratory support, referral, prolonged hospitalization, and adverse outcomes, and should evaluate standardized management protocols and newer bedside diagnostic approaches such as lung ultrasonography.

REFERENCES

1. Neri C, Sartorius V, De Luca D. Transient tachypnoea: new concepts on the commonest neonatal respiratory disorder. Eur Respir Rev, 2025; 34(175): 240112.
2. Daley S. Transient Tachypnea of the Newborn. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026.
3. Mino Y, Miyahara F, Miura M, Imamoto A, Fujii H, Moriwaki C, et al. Risk of transient tachypnea of the newborn following elective cesarean section increases at a gestational age of 37 weeks compared to that at ≥38 weeks despite the exclusion of pre-existing risk factors for neonatal respiratory disorders. Yonago Acta Med, 2024; 67(2): 150-156.
4. Bruschettini M, Hassan KO, Romantsik O, Banzi R, Calevo MG, Moresco L. Interventions for the management of transient tachypnoea of the newborn: an overview of systematic reviews. Cochrane Database Syst Rev, 2022; 2(2): CD013563.
5. Ota K, et al. The care of preterm and term newborns with respiratory conditions: a systematic synthesis of evidence from low- and middle-income countries. Neonatology, 2024.
6. Dhaka A, Kumar S, Singh P, Priyadarshi M, Chaurasia S, Bhat NK, et al. Nebulized salbutamol for the treatment of transient tachypnea of the newborn: a randomized controlled trial. J Perinatol, 2025; 45(11): 1595-1600.
7. Sartorius V, Brunet S, De Luca D. Characteristics of scores used for quantitative lung ultrasound in neonates: a systematic review. Eur Respir Rev, 2025; 34(176): 240232.
8. Sartorius V, De Luca D. Quantitative lung ultrasound in neonates: tried-and-tested systems simplify bedside use. Eur Respir Rev, 2025; 34(177): 250172.
9. McGillick EV, te Pas AB, van den Akker CHP, Keus JMH, Thio M, Hooper SB. Evaluating clinical outcomes and physiological perspectives in studies investigating respiratory support for babies born at

term with or at risk of transient tachypnea: a narrative review. Front Pediatr, 2022; 10: 878536.
10. Mino Y, Miyahara F, Miura M, Imamoto A, Fujii H, Moriwaki C, et al. Risk of transient tachypnea of the newborn following elective cesarean section increases at a gestational age of 37 weeks compared to that at ≥38 weeks despite the exclusion of pre-existing risk factors for neonatal respiratory disorders. Yonago Acta Med, 2024; 67(2): 150-156.
11. Jiang P, Wei J, Han M. Lung ultrasound to evaluate the outcome and prognosis of transient tachypnea of the newborn. Front Pediatr, 2024; 12: 1536992.
12. He L, Sun Y, Sheng W, Yao Q. Diagnostic performance of lung ultrasound for transient tachypnea of the newborn: a meta-analysis. PLoS One, 2021; 16(3): e0248827.
13. Niu Y, Han D, Kou C. Diagnostic accuracy of lung ultrasound for transient tachypnea of the newborn: a meta-analysis. Front Pediatr, 2026; 14: 1855601.
14. Kaur A, Gupta D, Priyadarshi M, Chaurasia S, Singh P, Bhat NK, et al. Lung ultrasound for predicting resolution of transient tachypnea of the newborn: a diagnostic accuracy study. CHEST Pulm, 2025; 3(4): 100216. doi: 10.1016/j.chpulm.2025.100216.
15. Dhaka A, Kumar S, Singh P, Priyadarshi M, Chaurasia S, Bhat NK, et al. Nebulized salbutamol for the treatment of transient tachypnea of the newborn: a randomized controlled trial. J Perinatol, 2025; 45(11): 1595-1600.: 10.1183/16000617.0172-2025.