



Respiratory Distress Syndrome:

Summary

Neonatal respiratory distress syndrome (NRDS), or surfactant deficiency disorder, is a lung disorder in infants that is caused by a deficiency of pulmonary surfactant. It is most common in preterm infants, with the incidence and severity decreasing with gestational age. Surfactant deficiency causes the alveoli to collapse, resulting in impaired blood gas exchange. Symptoms manifest shortly after birth and include tachypnea, tachycardia, increased breathing effort, and/or cyanosis. Suspected diagnosis is based on clinical features and confirmed by evaluating the extent of atelectasis via an x-ray of the chest. Blood gases show respiratory and metabolic acidosis in addition to hypoxia. Treatment primarily involves emergency resuscitative measures, including nasal continuous positive airway pressure (CPAP) and the stabilization of blood sugar levels and electrolytes. Intratracheal surfactant should be administered if infants require an increased FiO_2 to maintain a sufficient oxygen saturation despite receiving noninvasive positive pressure ventilation. Intratracheal surfactant should be administered if ventilation alone is unsuccessful. Most cases resolve within 3–5 days of treatment. However, complications such as hypoxemia, tension pneumothorax, bronchopulmonary dysplasia, or sepsis may still occur. In rare cases, NRDS may lead to neonatal death. NRDS can be prevented by administering antenatal glucocorticoids to the mother if premature delivery is expected.

Epidemiology

- Incidence^[2]
 - 1% of all newborns
 - 10% of all preterm babies
- The risk of developing NRDS depends on gestational age.^[2]
 - < 28 weeks of gestation: > 50%
 - > 37 weeks of gestation: < 5%

Epidemiological data refers to the US, unless otherwise specified.

FEEDBACK



*Respiratory Disorders:-

First/Respiratory Distress :-

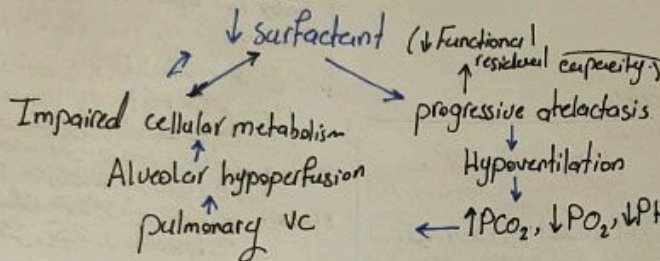
→ it's also called Hyaline Membrane Disease [Idiopathic RDS].

→ It's a major cause of death especially in prematurity. [preterm Neonatal]

Etiology: It's due to absence or deficiency of surfactant which is a phospholipid secreted by type II alveolar cells to line the alveoli.

→ Surfactant → ↓ surface tension of the alveolar walls → prevent alveolar collapse during expiration.
(Atelectasis) (تسبب انخفاص)

So...



Predisposing Factor:

1. prematurity
 2. Maternal DM
 3. C.S Delivery
 4. being male
 5. Hydrocephalus
 6. Hypotension, hypovolemia & cold stress.
- Glucocorticoids stress hormones → baby / تسبب انخفاص surfactant مع lung maturity.

→ C.S ماضيا كل هاد.

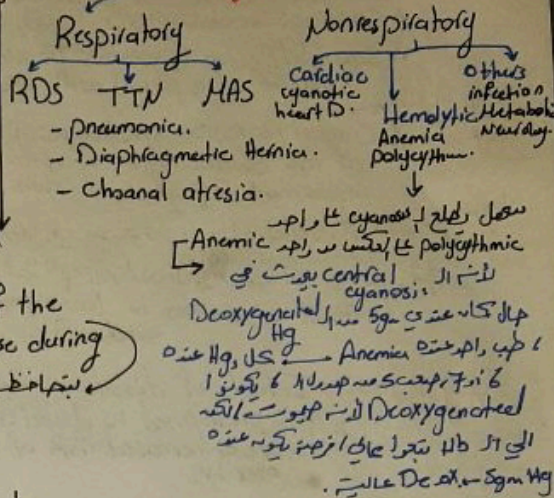
Note:

1% of all newborn is born with RDS, but 10% of premature Infant born with RDS.

TTN [Transient tachpnea of the Neonborn]

Full term كونها تسبب مع ال C.S Risk factor لها.

Respiratory Distress



على ان يسبح ال 28 تبليت لادة
هاي تتوزع مع رتقوا بوليفقا
1. نعو راد بولد premature
2. اساتصق اوما فرت بوزنج
المناسب اكما بالاتي ال alveolar
تبليد اكما collapse مسبب ال atelectasis
و بالتالي بولف بمر اهن ال RDS.
و تبليد ال baby ال عتاس DM
فتمها كيف.

تبليد فاضح ال
RDS نعو راد بولد بولي
بويظن انهم Glucocorticoids
قبل الولادة لبقيد ال
baby.

Followed up of Diagnosis :-
4. Blood

4. Blood gases $\rightarrow$ Hypoxic then Hypercapnic & Respiratory acidosis.

5. Amino acid analysis to predict if the baby may have
RDS after delivery.
(نسبة الفوسفوليبيدات)
(surfactant)

6. Lung biopsy: Eosinophilic material
cause basement membrane thickening

[illegible]

DDs of RDS:-

[] Transient tachypnea of the Neonatal -
[TTN] it's called wet ~~the~~ lung disease.

[2] Apnea of prematurity.
Indevelopment of Respiratory center lead
to Apnea.

[3] Meconium aspiration #.

[4] persistence pulmonary hernia

(5) Congenital diaphragmatic hernia

6] Congenital pneumonia
7] anaesthesia.

find
incl] 18] Pulmonary hypertension

curate and
the diagnosis. / RT + US

leukophages, Fever
 Infection
 Histology
 Inflammation
 Histology
 DDX
 CRP
 Infection
 Histology
 Inflammation
 Histology
 DDX
 CRP

RDS is complication DDx
 unilateral (unilateral) reduced breath so
 ↳ by auscultation I will find
 unilateral reduced breath so
 ↳ by x-ray I will find
 Pneumothorax more
 I can then confirm

Hydramnios, congenital diaphragmatic hernia, bowel obstruction to sustain it's normal size

small air way
↓ lung volume

central clear top cap
↓ alveoli
↓ number
↓ followed.

- Displaced + Enlarged heart

الزيت و مفعول
الزيت و مفعول

• Heart في Chest

Note:-

- Most accurate diagnostic test for RDS $\rightarrow$ L/S ratio
N: ($\geq 2:1$)

فهمه سكونه غني مشكله
فيلم (Diaphragm) ما بين
كوبه رافده / سكونه جناحت
رعيه ما بين (closure) بالافاقه
سكونه بين (piscoperforator)
fold (Inabel)
فهمه (closure) لـ (Fallost) سكونه
فهمه (fold) سكونه
نظار

abdomen
lung compression
hypoplasia
occurs early in neonatal life

unilateral ↓
↓ abdomen ↓
chest Auscultation ↓

لечение Treatment — مع الحروق
E. Intubation نفاذ
Gastric suction مع

positive pressure ventilation
GI Distension

Follow up of persistent HTN:-

→ TTT: supportive [follow up and check pulse oximetry]

↳ Give them Nitrous oxide [cause V/Q]

↳ The final TTT if supportive on is not effective is Extracorporeal membrane oxygenation [ECMO]

* Meconium Aspiration Syndrome: MAS

- Has the same manifestation of RDS.
- occurs in postterm newborn

طريقا Meconium هو أول براز يفرز في الحياة
 I'll life
 لو تفرز في الحبل أو stress كبري أو I'll life
 Meconium هو براز يفرز في الحبل أو stress كبري أو I'll life

Aminotic Fluid contamination with stool
 swallowing
 Meconium aspiration
 stress
 I'll life
 Meconium aspiration
 stress
 I'll life
 Meconium aspiration

↳ Risk factor + postterm baby

- perinatal asphyxia [stressful condition]
- oligo hydramnios baby.
- baby of HTN and diabetic Mother.
- Maternal infection or (chorio amnionitis) during pregnancy.

↳ In Imaging:

- patchy opacities [usually Asymmetric].
- Hyperinflation. [Anteroposterior diameter ↑]
- Flattening of Diaphragm.
- pleural effusion may occur.

X-ray manifestation

→ MAS itself consider as risk factor for pneumothorax

↳ TTT: Supportive care

- supplemental oxygen.
- Follow check repeatedly pulse oximetry.
- In severe cases [Give inhaled Nitrous oxide].
- Administration of surfactant [because meconium cause surfactant breakdown].
- May need (+) pressure ventilation.
- Neonatal ICU

acidosis + Insulin

collapse
 Cong. Diaphragmatic
 endotracheal intubation

21/11

Followed one

* Apnea of prematurity :- low birth wt leads to be more exposed. (centrom) < 1kg

: It's cessation of breathing for more than 20s or long enough to produce cyanosis & bradycardia.

Etiology:

Infection [Sepsis, Meningitis]

CNS [Hgc, Kernicterus, immaturity of Resp. center]

Respiratory [RDS, severe pneumonia, pneumothorax, Atelectasis]

Metabolic: [Hypoglycemia, Hypocalcemia, Hypoxia, Hypothermia, Hypo/Hyper Na⁺]

GIT: [GERD]

Resp. organs prematurity
heart. Function
Respiratory center
cyanosis
Apnea
baby

with Apnea
bradycardia

Stress
condition
Tachycardia
Apnea of RDS

Heart function

→ symptoms occurs within 1-2 days of Delivery.

→ Apnea comes like episodes. [> 20s]

Imaging: usually not necessary because it's clinical diagnosis. [Diagnosis of Exclusion].

So, DDx of Apnea of prematurity:

→ sepsis.
→ ICH.

sepsis
Neonatal
adult
hypoxia with
bradycardia
undveloped
Fever
Thermoregulation
hypothermia

Treatment:

(supportive) → position
avoid nasal suctioning
pressure ventilation.
and we can give them Methylxanthin.

* Transient tachypnea of the newborn [TTN]:-

Etiology:

It's caused by delayed or slow absorption of fetal lung fluid.
- It's common in PT or FT who delivered by C.S.

Risk factor:

- C.S. = prematurity
- Maternal asthma.
- II DM.
- Macrosomic baby.
- Male gender.
- Small for gestational age.
- precipitous labor

labor
stress
activation of Na⁺ channel.
squeezing

↓
TRDS
Match channels
↑ TTN

2nd stage
stress
[Rapid 2 stage of labor]

Followed

Clinical picture:

- Tachypnea of early onset → may be the only finding.
- other signs of RD including → Grunting, cyanosis which are relieved by minimal O_2 .
- Recovery is usually rapid with 3 days.
- Auscultation may show no crepitation/wheeze.

↳ but show Diffuse crackles + ↓ Breathing sound.

Imaging:-

CXR [best test]:

- Fluid in fissures [white].

- prominent vasculature
- Air-trapping.
- perihilar streaking.

Due to slow absorption of fetal lung fluid → ↓ pulmonary compliance and TV + increased dead space.

Treatment:

supportive, O_2 therapy.

- stop oral feeding till tachypnea improves.

غالبا ما يتدخل
Complications
في حالات الـ RDs
↳ 10% of cases may die.

Treatment of RDs:-

Best initial treatment: Oxygen.

لـ RDs الـ initial problem بالـ O_2

Hypoxemia الـ

لـ فاعل أزرر الـ PEEP في الـ FiO_2

بالـ O_2 90% من الـ O_2 الـ FiO_2

لـ PEEP الـ FiO_2 الـ O_2

الـ O_2 الـ FiO_2 الـ O_2

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Followed by *prognosis of RDS:-

Mortality rate < 10%.
recovery is within 1 week.

* Can we prevent RDS in premature baby :-
Yab, by give the mother before 48 hrs of

Delivery → Corticosteroids [Dexamethasone on 4 doses, every 12 hrs
[Betamethasone on 2 doses, 1 dose every 24 hrs] Give one dose]

Notes: As we said before,
The initial TTT is supplemental oxygen.

Non-invasive ventilation [by CPAP, PEEP] → Intubation

Artificial surfactant → Intubation

→ improve the prognosis of RDS, ↓ Mortality Rate.

but, there's side defect of Artificial surfactant?

- Intraventricular Hge.
- Hypotension.
- Bradycardia.
- Blockage of endotracheal tubes.
- Pulmonary Hemorrhage.
- Transient hypoxia.

* Indications of assisted ventilation are:

- $\text{pH} < 7.2$
- $\text{PCO}_2 > 60 \text{ mmHg}$
- $\text{PO}_2 < 50 \text{ mmHg}$ at O_2 conc. of 80-100%. [Type II respiratory failure]
- persistent apnea

* $\text{PCO}_2 > 50$ or $\text{PO}_2 < 50$ (Resp. Failure I)
* $\text{PCO}_2 > 60$ or $\text{PO}_2 < 50$ (Resp. Failure Type II)

← بالنسبة لـ statics في القلب [م] - 120

So, complication of RDS is classified to:

- * complication of Mech. venti.
- * " of surfactant.
- * " catheterization
- umbilical catheter
- umbilical vasa.

- umbilical v. thrombosis
- portal v. "
- portal HTN.
- pericardial Tamponade.
- umbilical a. perforation.
- catheterization lead to infection.
- Ischemic necrosis of Abdominal viscera.