
بسم الله الرحمن الرحيم

OPD follow up and screening of preterm infants

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Immunization

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Vaccine doses should not be reduced for Preterm Infant

- IM injections to preterm infants might require a shorter needle than the standard needle.
- Immunizations may be given during corticosteroid administration.
- PT infants should receive a full dose DTP, Hib conjugate, IPV and pneumococcal conjugate (PCV13) at 60 days' chronologic age regardless of BW and GA, as long as they are medically stable and consistently gaining weight.

HBV vaccine

If mother is HBsAg negative:

infant with **wt>2 kg**; 3-dose series at age 0. 1-2, 6-18 month

- infant with **wt<2 kg**: Administer **the first dose of HBV at 1 mounth or hospital discharge or when the wt reaches 2 kg(whichever is earlier even if Wt is still<2 kg•**

Immunize with **three doses** at 1-2, 2-4, and 6-18 months' chronologic age.

Administration of 4 doses is permitted when a combination vaccine containing Hep B is used after the birth dose(after 6 weeks)

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HBV vaccine

If mother is **HBsAg positive**:

Infant with **wt ≥2 kg** :: Administer **HBV and HBIG within 12** hours of age.

The second and third doses should be given at 1 and 6 months of age

infant with **Wt<2kg**: Administer **HBV and HBIG within 12** hours of age.

- Immunize with **four** vaccine doses at 0, 1, 2-3, and 6-7 months

Check anti HBs Ab and HBsAg at 9 -15 months of age.

- If anti-HBs and HBsAg are negative, reimmunize with three doses of vaccine at 2-month intervals and retest titers.
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HBV vaccine

- Serology should not be performed before 9 months of age because hepatitis B immune globulin (HBIG) may still be present;
- it should not be performed sooner than 4 weeks after the last dose of HepB vaccine because of the possibility of transient (<21 days) HBsAg-positivity related to the vaccine.
- ●**HBsAg-positive infants** – Infants who are HBsAg-positive **at any time during postvaccination testing** should be referred for evaluation of chronic liver disease .

HBV vaccine

- **Anti-HBs ≥10 (mIU)/mL** – Infants who are HBsAg-negative
- and have anti-HBs concentration ≥10 mIU/mL are immune
- to HBV. Additional doses of HepB vaccine and serologic
- testing are not necessary.

- •**Anti-HBs <10 mIU/mL** – Infants whose anti-HBs is <10 mIU/mL remain susceptible to HBV

HBV vaccine

If mother is HBsAg unknown:

- Administer **both HBV and HBIG by 12 hours** of age because HBV is less reliable.
- Test the mother immediately.
- Countinue vaccination and evaluation according to result of mother's test.

Rota V. vaccine

The AAP recommends routine immunization of infants with the rotavirus vaccine.

There is no preference for either RV5 or RV1.

Countrandication:

1-infant suspected to SCID

2-history of allergy to vaccine components

3-history of invagination

Any rotavirus vaccine–immunized infant who requires readmission to the NICU or nursery within 2 weeks of vaccination should remain under contact precautions for 2 to 3 weeks after vaccine administration

Anemia of prematurity

- **Causes**; impaired ability to increase serum EPO, iatrogenic blood loss due to blood tests ,reduced RBC life span, iron depletion
- **Symptoms**; tachycardia, poor wt gain, increased o2 requirement and episodes of apnea or bradycardia
- Neurological development in premature babies is affected by the amount of hemoglobin, so reducing it and iron level can have a negative effect on the infant's development at 18 months.

Anemia of prematurity

- Screening:before 6 month
- clinical evaluation : 1,6, 12,18, 24 months, also 3, 4, 5 years old
- Way to do:measurment of Hb and Hct

Anemia of prematurity

- **Prophylaxis;**
- **LBW baby**: 2-3 mg/kg/day begining at 1-2 months and countinuing up 24month.
- **VLBW** and ELBW baby: 3-4 mg/kg/day begining at 1 months and countinuing up 24month.
- treatment of anemia: ferrous sulfate drops (dose: 4 to 6 mg/kg/day iron) for four weeks one time, hemoglobin check one month later
- If Hct increases more than 3% or Hb more than 1 gr, continue the treatment for 3 months, it is better to check the retic level

Apnea of prematurity

- **Definition:**
- Breathing pouse longer than 15 to 20 seconds or less than 15 seconds but with changes in tonisity, bradycardia and cyanosis

- Apnea of prematurity that is secondary to underdevelopment of respiratory control centers is seen commonly in infants <34 weeks' gestational age.

Apnea of prematurity

. **types of apnea;**

central apnea is due to the depression of respiratory stimulants of the CNS and lack of development of the brain stem

obstructive apnea: is due to obstruction or instability of the pharynx and neck bending (by the absence of air entering into the chest despite the movement of the chest)

mixed apnea: the most common form of aonea of premaurity, due to obstructive apnea, followed by central apnea.

Aonea of prematurity

- **Treatment ;** mild and recurring apnea;
- gentle touch stimulation and support flow of oxygen with HHFNC or CPAP
- Resistant and recurrent apnea of prematurity: methyl xantins
- Xantins functions:
- reducing the threshold of respirstory centers to hypercapnea and increasing the strength of contraction of the diaphragm muscle and prevent of diapheragm fatigue

Apnea of prematurity

- Initiation of **caffeine** within the first 3 days of life in severely distressed infants less than 28 weeks can improve the prognosis,
- but it seems reasonable to delay the adminstration of caffein until the onset of apnea.
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- Coffeine treatment is usually continued until the GA 34 weeks or if the infant does not have apnea or beradycardia attacks for 5-7 days without posetive airway pressure.

Apnea of prematurity

- Apnea of prematurity is mainly resolved in 36-40 weeks.
- Cardiopolmonery accidents occur in most premature infants in 43-44 weeks and it returns to NL.

Apnea of prematurity

- **In opearation**
- Premature babies are at the risk of apnea after the operation .
- Anemia is a risk factor.
- **conservative method**; operate on a premature baby after 60 weeks (very little risk in this age)
- ,if it is not possible to postpone the surgery, it is better that the baby be on the monitor for ١٢ to ٢٤ hours after the operation after the last apnea attack.

IVH follow

- premature infants <1500 gr ⟶ Approximately 30% IVH.
- The risk increases with: decreasing BW and GA

- **Predisposing factors:** prematurity, IUGR, hypoxia, hyper and hypo carbia, hyperthermia, asphyxia, placental or maternal infection.
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IVH follow

- **Most of the babies with intraventricular bleeding do not have clinical symptoms.**
- changes in the form of apnea, pallor, cyanosis, poor sucking, loud crying, convulsions, hypotonia, metabolic acidosis, and shock can be among its symptoms.
- 50% of bleeding occur on first day and 75% on the first to third days.
- Premature babies bleed earlier. IVH is rare after one month of age.

IVH follow

- Ultrasound of the skull should be performed in ELBW babies between 3-5 days, and in other VLBW babies at the end of the first week of life
- Follow-up: with Cranial ultrasound in weeks 36 to 40 or the end of the first month and before discharge
- Cranial ultrasound in babies >32 weeks, if there are risk factors such as asphyxia and pneumothorax or neurological symptoms

IVH follow

- Follow up cranial ultrasound in any IVH;
- two to three times a week, at least once a week

- IVH with hydrocephalus: daily measurement of HC and at least weekly ultrasound

IVH follow

If there is progressive or continuous hydrocephalus, refer to nourosurgun.

Weekly LP indication: The presence of progressive or continuous hydrocephalus > two weeks and is symptomatic (prominent fontanel,diastasis of the sutures, rapid increase in HC >1.5-2 cm/wk

but it is better to decide on LP according to a combination of symptoms such as ventricular size>4 mm, pvd speed and the clinical condition of the baby.

hearing screening

- **Risk factor**:
- ototoxic drugs such as lasix and aminoglycosides, as well as the special condition of the neonatal intensive care units that in some of them The sound level is not controlled.
- Way of evaluation: Before being discharged from the hospital,with AABR method by oudiometer.
- (the term infants are screened with OAE)
- . It is recommended, also they be evaluated for their hearing status at the age of 1-2 years.

Hearing screening

All infants admitted to NICU must be screened for hearing loss before one month of age.

Infants who fail in the screening should be examined by skilled audiologist before three months of age.

appropriate intervention must be given before six months of age by exprienced specialist in hearing

Nephrocalcinosis

- **Risk factors:**
- hypercalciuria (the main pathophysiology factor), hypercalcemia, hypophosphatemia, increased creatinine level, dysfunction and transient renal failure in During the neonatal period,
- long-term need for oxygen, mechanical ventilation, drugs such as gentamicin, vancomycin, lasix, and xanthines.
- Diagnosis: The presence of scattered echogenic masses in the kidney parenchyma

Nephrocalcinosis

- **Nephrocalcinosis complications:**
- recurrent LUT infection, renal specially distal tubular and glomerular dysfunction , kidney stone and hematuria.

- Way of screening: kidney ultrasound for newborn >36 PMA or 1 month and 4 years-old.

Renel tubular disorders

- Amino acids and antibiotics that affect the kidney can cause the destruction of renal tubules and proteinuria or urinary disorders.
- Timely screening can prevent this destruction.

- Follow up: measurement of urine Ca, Mg, P, K, Pr and serum K, two weeks after stopping the treatment or at the age of 1 month.
- and measurement of Bun, Cr and anion gap levels

Thyroid screening

- Immediately after birth in a normal and mature baby TSH surge (70 mu/l up to 30 minutes after birth) that usually during 3 to 5 days after birth, it subsides.
- increased TSH couse 2-6-fold increase in T3 and T4 during the first hours of birth, which continued for 4-5 weeks after birth.
- In premature babies, the hypothalamus,pituitery,thyroid system is premature
- So transient hypothyroidism and hypothyroxinemia syndrome, which are very common in them.

Thyroid screening

- **Risk factors**:
- **Neonatal RF**:Wt<2 Kg, Wt>4.5 (at least 2-fold) the effect of Wt is U-shaped.
- F>M

Use of certain drugs, such as dopamine, blood transfusion or exchnge thatshould be Repeated thyroid tests 1-2 weeks later

- **Mother RF**: Preeclmpsia, diseases of the thyroid gland, gestational diabetes

Thyroid screening

sign and symptom:

- **At the begining of infancy**:
- prolonged jaundice, feeding disorder or poor feeding, facial puffiness,
- GA>42 weeks, Wt>4 kg, tongue enlargment,

pallor, hypothermia< 35 degrees,

inactivity and slow movements, Abdominal distention, constipation, large posterior fontanel,

respiratory disorders such as nosal stiffnes and congestion, and sleepiness

Thyroid screening

- **Manifestations in the 1 month of life:**
- mottling and pripheral cyanosis,
- edema in external genitalia,
- poor sucking and wt gain, constipation, abd distention,
- bradycardia,
- decreased activity, sleepiness, respiratory disorders due to a large tongue.

Thyroid screening

- **Manifestations in the first 3months:**
- umblical hernia, constipation, dry skin, tongue enlargment, generalized edema, harsh crying, heart murmur and cardiomegaly, pleural effusion without symptoms, macrocytic anemia, poor physical growth.

Thyroid screening

- Time of screening in high risk infant:3-5 days ,2 and 4 and 6 weeks old.
- In a study conducted by professor hemmati in shiraz in 1398 on among 355 premature newborns with high TSH: 31.3% was detected in 3-6 days of life, 43.9% in the 2 week, 14.4% in the 6 week, 9.9% in the 10 week, and 0.6% in the 20 week as hypothyroidism
- Action:sampling from the heel on 3-5 days and 2 weeks old

Thyroid screening

- If TSH>5 in on days 3-5 or TSH>4 on 2 weeks ; repeated test with venous sampling (TSH, free T4 and T4)
- If TSH>5 and T4<6.5 ; refer to ped Endocrinologist
- If tests are NL follow venous test in 4 weeks
- In intermediated cases and neonate with long term hospitalizattion :repeated test on 6 weeks.

The goals of treatment:

- Normalizing T4 within two weeks, normalizing TSH in 1 month(TSH;.5-2 miu/l and t4 in the higest NL limit)
- selective treatment is only levothyroxine tablets.
- although the most active form of thyroid hormone is T3, but the highest T3 used by the brain ,comes from converting T4 to T3(in brain),due to this treatment with T3 is not useful.
- Recommended dose:10- 15 mc/kg,
- although it is better in a baby with much less T4(<5mc/dl) is started with a dose of 50 mcg.

Thyroid screening

- Levothyroxine dosage should be changed according to the concentration of T4 and free T4, clinical symptoms and TSH cancentration(the most iportant factor is T4 concentration).
- Tablet should be administered once a day and 30 minutes before feeding.
- tablets can be taken with breast milk. We can Mix it with breast milk and water, but not with formulas containing soy protein or with iron compounds.

Thyroid screening

- Taking tablet should be at least 4 hours apart from taking calcium-containing compounds and 1-2 hours apart from taking iron-containing medicines.

- Re use tablet in case of vomiting within 30 min after taking tablet.

Thyroid screening

- guideline follow:
- 2 and 4 weeks after the start of treatment,
- every 2 months during the first 6 months of life,
- every 3 months between the ages of 6 and 36 months.
- 3 to 6 months from the age of 36 months (in the form of permanent illness)
- 2- 4 weeks after changing dose

Thyroid screening guideline in Iran

age	TSH	approach
3-7 days after birth	<5	NL
	5-9.9	Second screening up to 48hr after receiving the result If TSH<5 is nl If TSH>5,confirming test should be done and after if there is a disease start medication
	10-19.9	Confirming test at 2-3 weeks and after if there is a disease start medication
	>20	Get venous sample and start treatment
>8 days after birth	>4	Confirming test

The approach method with different panels of tests

Serum tests approval of diagnosis	action
Low T4 and high TSH	Treatment and follow up according guidline
NL T4 and high TSH	repeated test 2-3 times with an interval of 2-4 weeks, If NL t4 and high TSH ramain, start treatment in premature babies or patients, re-screening from the heel at the age of 2-4-6 weeks sh. If the diagnostic tests are abnormal and the disease is confirmed, levothyroxine replacement treatment should be started
TSH 6-10 mu/L after the age of 1 month	Repeated TSH after 2-4 weeks and if >10 mu/L start treatment in the future, if there is no need to use pills, the treatment should be stopped, if there is no treatment, the patient should be monitored for a period of about 3 months
Low T4 and NL TSH	tests should be repeated. Check the couse of Low T4 and NL TSH (central hypothyroidism or prematurity) Check TSH, T4,Free T4, if NL free T4 and high T3RU, threr is lack of TBG and no treatment is required.
Transient increase of TSH	repeated after 2-4 weeks, and if TSH>10mu/L (even NL T4), start treatment and follow

Thanks for your attention