I. Introduction:
Nearly 70% of term and 80% of preterm infants develop jaundice during the first week of life. Jaundice is the frequent diagnosis and reason of post discharge readmission in any neonatal set-up. While hyperbilirubinemia occurs in all of them, Phototherapy as a treatment modality has become the backbone of unconjugated hyperbilirubinemia in the neonate. It's non-invasive in nature and have fewer side effects as reported until now.

II. Definition:
Photo therapy consists of the application of fluorescent light to the infant’s exposed skin, light promotes bilirubin excretion by photolysis which alters the structure of bilirubin to soluble form (human bilirubin) for easier excretion.

III. Nursing care and procedure for photo therapy:
1. Undress the baby completely.
2. The baby's eyes are shielded by an opaque mask to prevent exposure to the light.
3. The eye shield should be properly sized and correctly positioned to cover the eyes completely but prevent any occlusion of the nares.
4. The baby’s eyelids are closed before the mask is applied, because the corneas may become excoriated if they come in contact with the dressing.
5. On each nursing shift the eyes are checked for evidence of discharge, excessive pressure on the lids or corneal irritation.
6. Eye shields are removed during feedings, which provide the opportunity to provide visual and sensory stimulation.
7. During breastfeeding switch off the photo therapy unit.
8. Provide frequent breastfeeding.
9. Turn the baby after each feed to expose maximum surface area of baby to light.
10. Keep baby at a distance of 45 cm from the light source.
11. A special light-permeable photo therapy diaper, or bikini diaper fashioned with a face mask may be used to cover the genitalia and buttocks.
12. Keep diaper area dry and clean because skin in this area is prone to break down.
13. Babies who are in an open crib must have a protective plexiglass shield between them and the fluorescent light to minimize the amount of undesirable ultraviolet light reaching their skin and to protect them from accidental bulb breakage.
14. Monitor temperature every two to four hour or more frequently if fluctuation in temperature is noted.
15. Maintaining the baby in a flexed position with rolled blankets along the sides of the body helps maintain heat and provides comfort.
16. Maintain thermoneutrality - measure incubator or isolate temperature as well as infant's light affects the ambient temperature.
17. Do not expose the thermistor probe to the light without the probe's being covered with opaque tape.
18. Adequate fluid intake should be provided either orally or intravenously. Vasodilation increases the insensible water loss and there is excess stool loss from occasional diarrhea, keep urine specific gravity below 1.015. (Breastfeeding or 10-20% extra fluids are provided)
19. Ensure that the baby passes adequate urine (6-8 times per day)
20. Weight is taken at least once a day.
21. Ensure that serum bilirubin levels are obtained as prescribed. The diminishingicterus, i.e. the lowering of unconjugated bilirubin from cutaneous tissue does not reflect the serum bilirubin concentration.
22. Discontinue photo-therapy when serum bilirubin returns to a safe value as per unit protocol.
23. Monitor clinically for rebound bilirubin rise within 24 hours after stopping phototherapy for babies with hemolytic disorders.
24. Accurate charting is another important nursing responsibility that includes: time that photo therapy is started and stopped, proper shielding of the eyes, and covering of the testes (genitals) type of fluorescent lamp (by manufacturer) number of lamps, distance between sur-

AUTHOR:
Principal, College of Nursing,
Civil Hospital Campus, Asarwa,
Ahmedabad / 380016

Nurse's Responsibilities in Phototherapy
Pratima H Mali (M.N.)
face of lamps and infant (should be not less than 45 cm).

- Use of photo therapy in combination with an incubator or open bassinet.
- Photometer measurement of light intensity.
- Occurrence of side effect.
- Length of time the bulbs have been used.
- Effectiveness of light of the wave length decreases after 800 hours of use; thus bulbs should be changed at the correct time. A record of hours of use is essential.
- Maintain vital signs every 2 hourly
- Record feeding chart, weight chart, regularly
- Serum bilirubin is monitored at least every 12 hours
- Record weight daily.

IV Side effects of phototherapy:
Photo therapy is not a harmless intervention. It can produce adverse effects on the baby and may disturb medical and nursing personnel

a. Lethargy
b. Loose green stool, frequent vomiting

c. Increased insensible water loss: provide more frequent extra breastfeeding

d. Dark Urine.

e. Temperature elevation.

f. Skin changes - greenish to yellow due to capillary dilation - skin rashes - no need to discontinue photo therapy.

g. Turn infant on abdomen for short period of time and will cease priapism (persistent abnormal erection of penis)

h. Retina damage; prevented by shielding the eyes.

i. Hypo or hyperthermia. Monitor temperature frequently.

j. Increased metabolic rate, dehydration, and electrolyte disturbances such as hypocalcemia.

k. Frequent stools can cause perineal irritation therefore meticulous skin care especially keeping the skin clean and dry is essential.

l. Bronze - baby syndrome - in which the serum, urine and skin turn grayish brown several hours after the infant is placed under the light. This reaction is probably caused by retention of a bilirubin break down product of phototherapy, possibly copper porphyrin.

The syndrome almost always occurs in infants who have elevated conjugated hyperbilirubinemia and some degree of cholestasis. The browning generally resolves following discontinuation of phototherapy.

m. Photo therapy has been shown to affect short term behavior of the term infant, which has been attributed to maternal separation. This least discussed and often overlooked aspect, is the most common side effect, so one should encourage the mother to breastfeed and interact with her baby regularly during phototherapy.

V Caution:
1. Do not use photo therapy without trying to find the cause of jaundice.

2. Photo therapy results in dehydration and iatrogenic hyperthermia/hypothermia.

3. Blue light may interfere with monitoring of cyanosis. Blue light cause nausea, giddiness and headache which may affect/distract the staff.

4. In direct hyperbilirubinemia, photo therapy results in Bronze baby syndromes (green colour).

5. Nurse should wear sunglasses and cover the hair with a cap or bandana, when caring for an infant under blue light for her own protection.

6. If the nurses skin is sensitive to the lights a screening substance may be used to prevent tanning of exposed area.

VI. Conclusion:
Phototherapy continues to be the preferred method of treatment for neonatal hyperbilirubinemia by virtue of its safety and non-invasive nature. Effective nursing care during phototherapy and appropriate use of phototherapy has significantly reduced the need for exchange blood transfusion. It is convenient and inexpensive. It is used even in small hospitals and nursing homes.

References:


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