CLINICAL PRACTICE GUIDELINE
KEMH Postnatal Wards

Pulse Oximetry Screening to Detect Critical Congenital Heart Disease

This document should be read in conjunction with the Disclaimer

Background

Critical congenital heart disease can be diagnosed by fetal ultrasound, however around 50% will still be missed. Babies may lack clinical signs in the first day of life, appearing pink despite a “cyanotic” heart lesion, with lack of murmur and apparently palpable femoral pulses in coarctations. A UK study estimated that 25% of babies with congenital cyanotic heart disease are not diagnosed until after discharge from the nursery. Delayed diagnosis can be associated with increased mortality and morbidity from multi-organ damage. At least 3 babies have been identified at KEMH over 8 years who were discharged with a critical congenital heart lesion undetected prior to screening.

There is a significant amount of data to suggest that routine use of pulse oximetry before discharge will diagnose a substantial proportion of babies who would have otherwise been missed by routine examination (~ 50%). The data is all from observational studies.

This MEANS for every 1000 babies screened about 7 cases need further evaluation with 1 in 5 of those having a critical heart lesion.

Timing of the screening is important, if done after 24 hours the screening outcomes were improved to a positive predictive value of 47%.

Another interesting and important finding in many studies is that babies with serious, potentially life-threatening, non-cardiac, hypoxemic condition, such as respiratory or infective disorders, are also identified by POS. These babies are usually classified as false positives, but is generally accepted that early detection of these babies, before they become unwell, is a potential advantage and the label of false positive is perhaps a misnomer.

The majority of the data comes from screening lower limb at >/= 95% cut off. Some studies have also included a measurement of the difference between upper and lower limb (to rule out coarctation of the aorta). Certainly coarctation of the aorta remains a diagnostic challenge and in the studies reviewed by AAP this is the cardiac lesion least likely to be found with the oximetry screening test.

After a Western Australian audit of cases in 2018 with only 4% being diagnosed statewide on oximetry screening a decision was made to include the difference between pre and post ductal (right hand and foot) saturations with >3 being considered abnormal and if on repeat consistently different should also warrant echocardiography. This is now standard in most international guidelines (America, Canada and Europe) although some use a difference >2 not 3. The aim is to diagnose more left obstructed lesions (including coarctation of the aorta) prior to discharge.

Key Points

- Pulse oximetry can detect some critical congenital heart disease that would otherwise be missed on routine examination / antenatal USS.
- The ideal time for oximetry is around 24 hours of age.
- ≥95% plus difference between right hand and either foot ≤3 is considered normal and a baby can then be discharged as normal.
- Verbal consent should be obtained and the screen documented in the notes on the Neonatal History MR410 form below day 1 check.

Screening Process

- An *appropriately prepared health professional to screen all neonates born at KEMH prior to discharge (ideally at around 24 hours of age, but for early discharge within 1 hour of discharge) with right hand and lower limb O_2 saturations.
- The screening should occur around the time of the RMO discharge review. Take the highest number the trace gets to as the screening number (the probe only needs to only on until a good steady trace is obtained which may take < 1 minute). The baby should not be feeding and should be settled.

Normal ≥95% oxygen saturation

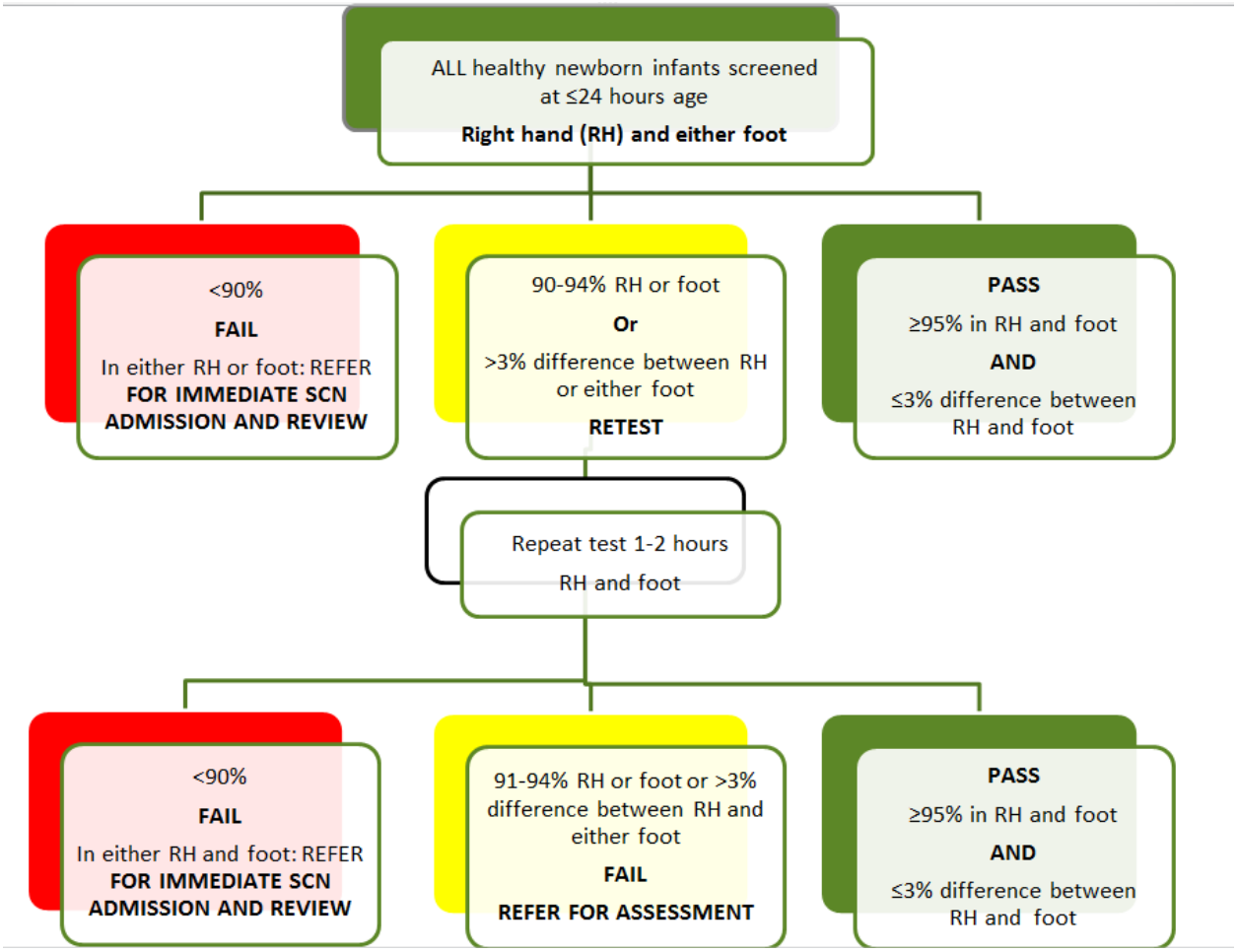
And difference between right hand and lower limb ≤3

- If O_2 saturations 91 – 94% → medical review to consider other causes (mainly sepsis). If well with a normal examination → repeat screening test in 1-2hours when baby settled.
- If still abnormal after 2 tests → for a senior review (SR or Consultant Neonatologist) and refer to cardiology as necessary.
- If O_2 saturations <90% → admit to SCN immediately and for senior review and continuous oximetry monitoring. Other causes need to be excluded (with possible septic work up and IV antibiotics, CXR and assessment. Other problems – upper airway, neurological, polycythaemia, persistent pulmonary hypertension). Studies show up to 50% of babies screening positive have signs of sepsis on further evaluation.[2]
- If no other cause found echocardiogram to be performed at time dictated by Cardiologist (may be next day but prior to discharge).

Documentation

- The outcome of screening should be documented on the neonatal examination form Neonatal History MR410.
- Any abnormal screening should also be documented in the inpatient history with the medical review.

Note: *An appropriately prepared health professional* is either a paediatric medical officer or a midwife who has successfully undertaken the Full Physical examination of the Newborn (FPEON).



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