Guidelines for detecting and managing Neonatal Hypoglycemia

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Looking for Hypoglycemia in Newborns

- What is hyperinsulinism
- How common is hyperinsulinism
- Why is it difficult to diagnose hyperinsulinism in the newborn period
- How often do babies with hyperinsulinism get missed
- What can we do to diagnose all babies as soon as they are born

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What is Hyperinsulinism

- Congenital Hyperinsulinism (CHI)
- Hyperinsulinism (HI)
- Persistent Hyperinsulinemic hypoglycemia of infancy (PHHI)
- Hyperinsulinemic hypoglycemia (HH)
- Hypoglycemia or Hypoglycaemia

What are the different types of HI

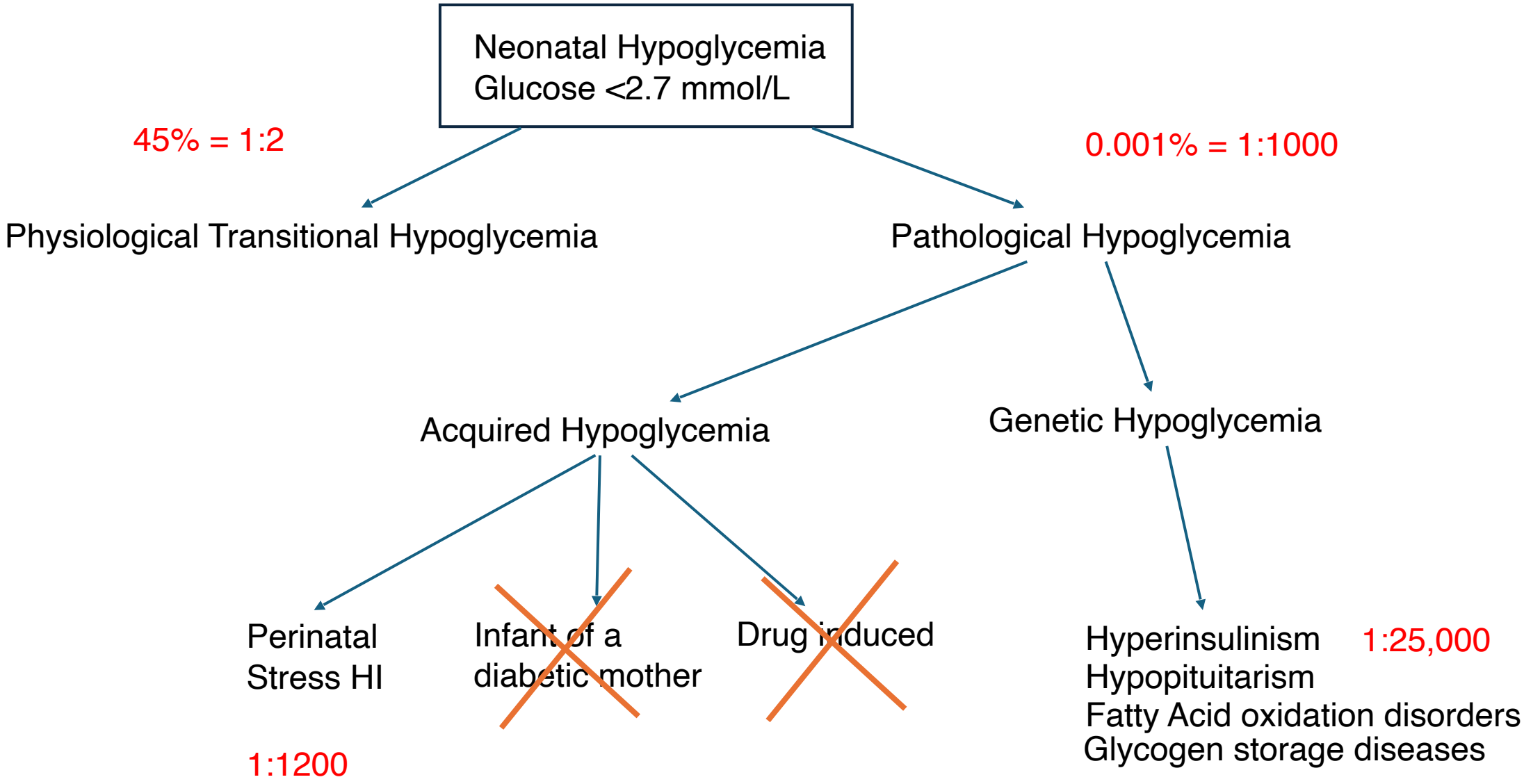
- Infants of mothers with Diabetes
- Perinatal stress hyperinsulinism (PSHI)
- Genetic forms of Hyperinsulinism
  - Single gene HI
  - Syndromic HI

How long does hyperinsulinism last

- Infants of mothers with Diabetes
  - Usually lasts 24 hours or less but rarely can last up to a week
- Perinatal stress hyperinsulinism (PSHI)
  - Usually lasts 5-10 days but can last up to 6 months
- Genetic forms of Hyperinsulinism
  - Single gene HI
    - Can last a lifetime but gets better and easier to manage after 5-10 years
    - Can sometimes turn into diabetes later in life
  - Syndromic HI
    - Usually last <10 years but can last longer

What are the different causes of Hypoglycemia

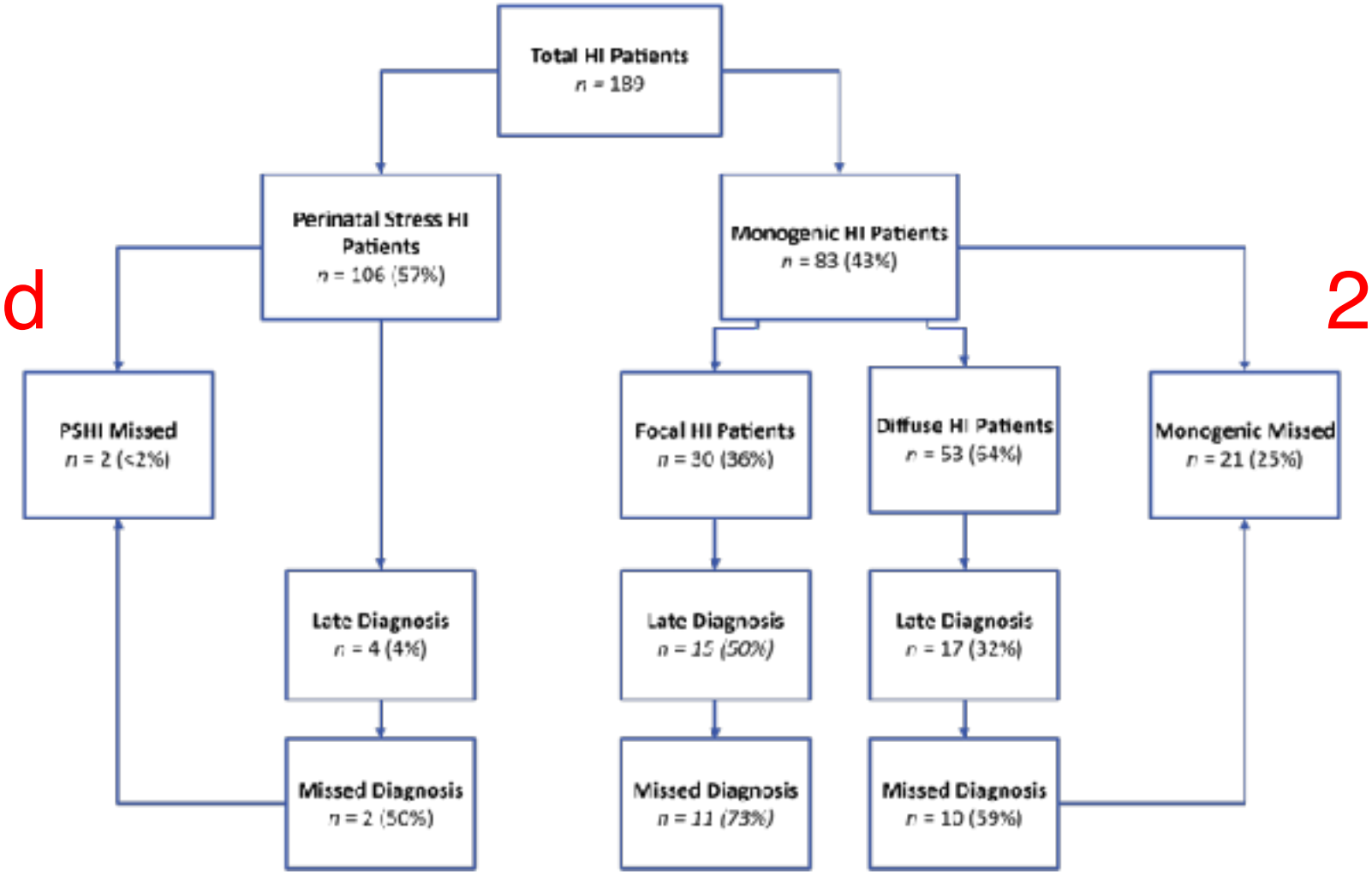
- There are many other endocrine and metabolic diseases that cause hypoglycemia
- Many of them but not all are first diagnosed shortly after birth
- So just look for babies with low blood sugar and we will find all the babies with hypoglycemia
- The problem is normal newborn babies have lower blood sugars than babies when they are older than 5 days


Neonatal Hypoglycemia
Glucose <2.7 mmol/L
45% = 1:2
0.001% = 1:1000
Physiological Transitional Hypoglycemia
Pathological Hypoglycemia
Acquired Hypoglycemia
Genetic Hypoglycemia
Perinatal
Stress HI
1:1200
Infant of a
diabetic mother
Drug induced
Hyperinsulinism
1:25,000
Hypopituitarism
Fatty Acid oxidation disorders
Glycogen storage diseases

How often are babies with hyperinsulinism missed ?

2% missed

25% missed



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Why the difference between the different forms of HI

- Infants of diabetic mothers get screened
- PSHI is usually associated with risk factors and get screened
  - Small babies, distressed babies, emergency C-section babies
- Genetic HI
  - Sometimes they are large babies but often not
  - Sometimes they have a family history of someone with HI
  - Sometimes they have features of a syndrome

- But usually you do not suspect Genetic HI until they have hypoglycemia

Should we just screen all babies?

- In America most babies are sent home within 48 hours of birth
  - So there is enough time to screen all babies
- What test would we do
  - Glucose test
    - But 45% of all babies have a low glucose
    - Not all HI babies have low glucose all the time
  - Genetic test
    - Results take too long
    - Not all babies have a positive test
    - It is hard to tell who has disease and who just is a carrier of a gene variant from a genetic test alone

What is a good compromise

- Do 3 things:
  - Follow the current neonatal guidelines and screen all babies with risk factors for hypoglycemia
  - Follow the STABLE program and screen all babies with low oxygen levels at birth
  - Follow the current PES guidelines and make sure that all babies
    - Who have symptoms of hypoglycemia,
    - Need IV glucose to treat hypoglycemia
    - Have a family history of a hypoglycemic disorder
    - Have syndromes like BWS
  - **Have a fasting test before they go home to see if the hypoglycemia has resolved**

Summary

- We currently diagnose >95% of babies who have hypoglycemia due to mothers having diabetes or PSHI in the immediate newborn period
- 40% of babies with Genetic HI go home from the hospital without a diagnosis
- 64% of those babies were missed and should have been diagnosed
- If we follow the 3 rules we would pick up most babies with HI but not all

Thank You

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