



INSULIN THERAPY IN VERY LOW BIRTH WEIGHT INFANTS

INTRODUCTION

- Hyperglycemia is common in very low birth-weight (VLBW) infants.
- The frequency of hyperglycemia is inversely proportional to birth weight and ranges from 2% in infants greater than 2000 g to 60–80% in infants less than 750 g.

etiology

1. Exogenous parenteral glucose
2. VLBW infants
3. Sepsis
4. Drugs: methylxanthines, glucocorticoids
5. Lipid infusion
6. Stress premature infants, Surgical procedures
7. Hypoxia
8. Neonatal diabetes mellitus
9. Diabetes due to pancreatic lesions
10. Hepatic glucose production
11. Immature development of glucose transport proteins

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- untreated:
 - bacterial and fungal infections
 - compromised neurologic development
 - osmotic diuresis
 - dehydration
 - weight loss
 - increased mortality

DEFINITION OF HYPERGLYCEMIA


- serum glucose blood level $> 125\text{mg/dL}$ in term infants or $>150\text{mg/dL}$ in premature infants
- There are no specific symptoms associated with neonatal hyperglycemia
- Major clinical: hyperosmolarity and osmotic diuresis

treatment

1. Measure glucose levels in premature infants and infants with abnormal symptoms
2. VLBW(1000gr):should start with an IV G >5%,if hyperglycemia glucose intake is reduced 4 to 6mg/kg/minute,decrease glucose infusion by 2mg/kg/minute every4-6 hours
3. Begin parenteral nutrition as soon as possible in VLBW





- Insuline therapy:

- GB >250mg/dL despite efforts to lower glucose delivered
 - Prolonged restriction of parenterally administered glucose would decrease the require total caloric intake
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- Insulin infusion

- Bolus: 0,05-0,1 UI/kg q4-6h, infuse over 15 Minutes
- Continuous: 0,01-0.2 UI/kg/h
 - usual start 0,05 UI/kg/h
 - Check glucose level every 30 minutes until stable to adjust the infusion rate
 - Glucose level >180 mg/dL, titrate in increments of 0,01 UI/kg/h
 - Hypoglycemia: discontinue insulin infusion. administer IV bolus D10% at 2 ml/kg/dose

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- Note: neonatal may be extremely sensitive to the effects of insulin.
 - To avoid hypoglycemia and to ensure that clinically important nutrition goals are met.
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- **early insulin therapy
in very low birth weight infants?**


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- BioMed Central.2007 August 10
 - A multi-centre, randomised controlled trial of early insulin replacement in very low birth weight babies:500 infants from 10 centres in the UK and Europe
 - Receive a continuous insulin infusion:0.05UI/kg/h or standard neonatal care from 1st to 7th day



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- If BG levels fall infants will receive 20% dextrose titrated to maintain normoglycaemia
 - If BG is consistently above 180mg% babies will receive standard care treatment with additional insulin infusion
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results

- At this time:
 - influence pancreatic development and β cell survival
- Later:
 - Influence motor and cognitive impairment
 - risk of type 2 diabetes later in life.

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- Journal Pediatric.2007 Dec
 - A randomized controlled study n=16 VLBW infants
 - Received insulin group:0.025U/kg/hr on 1st to 7th ,20% dextrose to maintain normoglycemia
 - Control infants :received neonatal care

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- Results:
 - The standard care infants were hyperglycemic for 35.9% of the study period, compared with 7.6% for the insulin-treated infants
 - The insulin-treated group had a 2.4-fold increase in mean IGF-I bioactivity
 - Conclusions: Early insulin therapy improves blood glucose control and increases IGF-I bioactivity levels

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- New England Journal Med.2008 Oct
 - Multicenter trial:195 infants received infusion insulin at dose 0.05U/kg/hr with 20%dextrose and 194 infants received standard neonatal care on 1st to 7th day
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results

outcomes	Early insulin	Standard care		
Mean glucose level(mmol/l)	6.2	6.7	-1.4/-2.2, P=0.007	
Hyperglycemia	21%	33%	P=0.008	
Carbohydrate infuse(kcal/day)	51	43	P<0.001	
weight loss	less		P=0.006	
hypoglycemia	29%	17%	P=0.005	
Mortality ,morbidity	No different			



CONCLUSIONS


Early insulin therapy offers little clinical benefit
in very-low-birth-weight infants

Reduces hyperglycemia but may increase
hypoglycemia



Clinical bottom line

- Early insulin therapy in the hyperglycaemic ELBW infant improves blood glucose control, caloric intake, and probably weight gain. It is not clear whether this confers any long term advantage.

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- Insulin therapy in the hyperglycaemic VLBW infant between 1000 and 1500g is difficult to evaluate due to lack of good quality studies in this weight category.
 - Hypoglycaemia remains an important complication of insulin therapy.



■ THANK YOU