

Hypoglycaemia in a term infant form diabetic mother



**ASSIGN
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ASSIGNMENT TITLE: Critically analyse the care provided to an infant from a diabetic mother and family

The following assignment will discuss the care of an infant within a special care baby unit, the care provided will be critically analysed and local, national guidelines and recent research associated with the care of the infant will be discussed.

In order to ensure confidentiality and in accordance with Nursing and Midwifery Council (2015) the infant being discussed will be referred as Infant B. for the purposes of this assignment the nursing framework Casey, A. (1988), will be used. Casey model includes child, family, health, environment and nurse however to personalize the care provided the main focus within this assignment will be concerning blood glucose control though, temperature control, minimized pain, maintaining a safe environment, establishing feeds, communication and family centred care will be discussed as well in relation to blood glucose control.

The rationale supporting the use of Casey model is said to focus on family centred care that is redefining the relationships in health care, increasing and becoming one of the main goals on the neonatal units across the world (Staniszewska et al., 2012). Casey, A. (1988) acknowledges the vital role of the parents and family and ensures the everyday care of the child through a partnership and negotiation between parents and family and the nurse (Casey and Mobbs, 1988; Patient- and Family-Centered Care and the Pediatrician's Role, 2012).

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This assignment is focused on the care of infant B, born at term at 41 weeks and two days gestational age within an antenatal diagnosis of maternal diabetes mellitus type I with a birth weight of 3140 grams, over two consecutive night shifts. Admitted to special care with one day of life with diagnosis of hypoglycemia one of the most frequent causes of admission in this sector (NHS Improvement, 2016). The assessment of infant B. was performed at the moment of admission on the first day after transferred from post-natal unit as per Trust policy. An adequate assessment is a crucial component of nursing practice, mandatory for planning and provision of patient and family centred care (Staniszewska et al., 2012) fundamental for their professional accountability and responsibility RCN (2014.) IDM according with UNICEF (2013) are “ at risk” and need to be correctly identified and managed appropriately.

The definition of hypoglycemia in the newborn infant has remained controversial because of a lack of significant correlation among plasma glucose concentration, clinical signs, and long-term sequelae (WRIGHT and MARINELLI, 2014; Hay, et al 2009; UNICEF, 2013) Bulbul and Uslu (2016) concluded that there has been no substantial evidence-based progress in defining what constitutes clinically important neonatal hypoglycemia, particularly regarding how it relates to brain injury. However they consider clear the definition of transient and persistent hypoglycemia and their differences (Cornblath et al., 2000).

Many authors have suggested a numeric definitions of hypoglycemia that are variable in postnatal age (Cornblath and Ichord, 2000; Harris at al, 2012;

Hawdon 2013; Arya at al, 2013; Stomnaroska-Damcevski, 2015; Adamkin, <https://assignbuster.com/hypoglycaemia-in-a-term-infant-form-diabetic-mother/>

2016). The value 2.6 mmol/l was adopted by many clinicians and by the Trust as well, however there is no scientific justification for this value (Wright and Marinelli, 2014).

On admission infant B. presented with a low blood glucose level (BGL) of 1.3 mmol/L. In order to increase blood glucose level, a peripheral venous line (PVL) was inserted in right foot as per Trust policy (2012) (NICE, 2015), 10% Dextrose bolus administered, started intra venous fluids of 10% Dextrose and a nasogastric tube inserted. Blood glucose level checked 30mins after (NICE, 2015), level increased to 3.1 mmol/l. IV fluids started (60ml/kg/day) (NICE, 2015; BNF, 2015) and BGL checked 1-2 hours after. Frequency was based on infant B condition (Stomnaroska-Damcevski et al, 2015).

Dextrose 10% is given to restore blood glucose levels and provide calories minimizing liver glycogen depletion (BNF, 2014). Administration of a 10% Dextrose is protocolled but this value, once more, it is not consensual in literature (BNF, 2010; Arya et al 2013; Adamkin, 2016). A bolus was given first, with higher concentration than infusion, to increase quicker the values and followed by the infusion to stabilize the levels (Adamkin, 2011). The goal is to achieve a blood glucose level of 2.6 to 9 mmol/L (Rennie and Kendall, 2013). Frequent Dextrose bolus are not recommended (WHO, 1997) per risk of hyperosmolar cerebral oedema.

A study developed by Heagarty (2016) showed significant benefits of oral dextrose gel as an option for treatment of symptomatic hypoglycemia.

Shows that is most effective, well tolerated and reduce 50% the incidence of neonatal hypoglycemia in high risk infants, but just for newborn babies in

postnatal unit, not indicated for NICU admissions due to severity conditions (BNF, 2015). Hawdon et al (1994) describe a persistent effect and side-effects, and high doses can stimulate insulin release, that can be a reason why oral glucose gel it is not used in NICU. Other option is glucose water however studies (Wight and Marinelli, 2014) indicate that has insufficient energy and lack of protein.

At delivery, glucose supply from mother to the infant stops, and consequently glucose concentrations decrease rapidly, until a exogenous source of glucose is available, the infant depends on his hepatic glucose production to face metabolic needs and maintain the homeostasis during the first few days (Boissieu et al. 1995; de Rooy and Hawdon, 2002). The pediatric endocrine society considers the first 48h of a health newborn infant a normal period of transitional hypoglycemia (Cornblath and Ichord, 2000; Merenstein and Gardner, 2011). Low ketones levels, inappropriate preservation of glycogen, and low glucose levels, are characteristics of this period and may activate mechanisms for brain protection (Adamkin, 2016; Standley, et al, 2016). Acute neurophysiological changes occur when human neonates are low in BGL and the long-term significance of these acute changes is not clear (Cornblath and Ichord, 2000).

The presence of risks factors, as an infant from a diabetic mother (Rennie and Robertson, 2013) predisposing an infant to hypoglycemia, and increase the risk of persistent hypoglycemia (Thornton et al., 2015). Highlighting the risk factors may determine an appropriate management and a proper planning since the delivery (Lang, 2014) and according with UNICEF (2013)

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appropriately. Based on this we can consider infant B a high risk baby to develop hypoglycemia with risk for persistent hypoglycemia.

As an IDM, infant B. developed in postnatal period a hypoglycemia episode, this can be considering a transitional hypoglycemia that is caused by hyperinsulinemia (Stanley at, 2015). A study developed by Isles, Dickson and Farquhar (1968) suggests IDM removes glucose quicker than babies from a non-diabetic mother, and that comes from the ability to produce more insulin based on memory of levels experienced in utero. Hyperinsulinism is the most common cause of increased utilization of glucose, and can be temporary, for example when the fetus has been in contact with a hyperglycemic environment by poorly controlled maternal diabetes, (Rennie and Robertson, 2013). In this stage is important to screen for transient and persistent hypoglycemia, the last one with high risk to develop permanent hypoglycemia and consequently induced brain injury (Adamkin, 2011).

Neonatal hypoglycemia is commonly asymptomatic but non-specific and extremely variable signs can be presented (Merenstein and Gardner, 2011). In the Trust we apply N-PASS scale to assess pain, agitation and sedation (Hummel et al, 2004) Neurological manifestation as irritability, jitteriness, lethargy, seizure and cardiorespiratory manifestations like cyanosis, pallor, apnea, irregular respirations, tachypnea and cardiac arrest can be presented. Infant B on admission had an appropriate crying not irritable, appropriate behavior, relaxed facial expression, normal tone and with vital signs in normal range. N-PASS scale was applied every three hours when vital signs evaluated, on every procedure and every time that was appropriate.

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Hypoglycemia cannot be defined only based on single BGL, has to contextualize with infant and mother history (Cornblath and Ichord, 2000). A study developed by Eidelman and Samueloff (2002) associate directly physiopathology of an IDM with metabolic processes including fetal hyperglycemia and fetal hyperinsulinemia, this fetal hypermetabolic state promote somatic growth, obesity, and metabolic disturbance in short and long-term consequences. Diabetic control early in pregnancy is associated with normal neurodevelopment outcome, but according with Schwartz and Teramo, (2000), blood glucose control increases their importance during the pregnancy and especially during the labor and delivery.

IDM according with WHO (1997) as high risk for hypoglycemia however, Hawdon (2015) and NICE (2015) says if prenatal and intrapartum are followed by a specialist and monitored this babies should be treated in a first approach as a low risk infant, and the baby can stay with the mother after birth to monitor BGL for 24h or 12h if stable (Adamkin, 2011). IDM is not an indication to be admitted in the neonatal unit.

Managing a baby asymptomatic with confirmed hypoglycemia relies on continuing breastfeeding but now more frequently (Amended, 2015), feed 1-3ml/kg (up to 5ml/kg if needed) of expressed breastmilk (EBM) or substitute nutrition (formula, donor human milk) (NICE, 2013; Hegarty, 2016).

Increasing frequency will provide more colostrum for the baby, will stimulate the breast to produce more milk, it's a moment to practice skin-to-skin, provides a relaxing healthy moment for both encouraging bonding (Adamkin, 2016)

Infant B. developed hypoglycemia in post-natal unit and formula milk was started, to receive proper neonatal care had to be separated from mom. This fact interfered with breastfeeding, production of breast milk and bonding between mother and newborn (Sparshott, M., 1997). Mother B didn't have any milk production and that was a trigger for a stressful situation.

Assessment of knowledge of all situation was done; emotional support was given, educated and encouraged to continuing breastfeeding, explained importance of breastmilk. Colostrum is the first milk produced by a mother, as a high concentration of nutrient and sugar and ideal to help blood glucose level to reach acceptable values (Wight and Marinelli, 2014). Breastmilk is preferred to formula for association with increase of ketones production (Hawdon et al 1992) and lower blood glucose values in term babies fed with formula, related with insulinogenic effect of protein in formula (Lucas et al, 1981).

In partnership with mother B. was planned to stop formula milk when possible and all the EBM expressed was given to infant B. Encourage skin-to-skin contact and unlimited access to breast. (Wight and Marinelli, 2014) It is extensively documented in the literature (Tessier, (1998); Almeida et al., 2010; Heidarzadeh et al., 2013; Blackman, 2013) that kangaroo care provides health benefits not only for the infant but also for parents. A study performed by Heidarzadeh et al. (2013) conclude 62. 5% of the mothers that provide kangaroo care to their babies were discharged from the hospital exclusively breastfeeding their babies, comparing with 37. 5% of the group that didn't provide kangaroo care. Almeida et al. (2010) in a similar study concludes 82% on discharge go home exclusive breastfeeding. Blackman in

2013 performed a study where one of the subjects evaluated was blood glucose level when provided kangaroo care and results were significantly higher comparing with infants that didn't received. Tessier in 1998 cit by Poppy Steering Group (2009) conclude kangaroo care reduce maternal anxiety, and increase a mother's sense of competence and sensitivity towards her infant.

After birth, one of the most important changes is related with metabolism energy and thermoregulation. Infant B. is a term baby however, is a newborn and the risk of disturbance of the thermoregulation is present (Arya at al 2013). A newborn after birth, loses heat immediately by evaporation, convection, conduction and radiation, dependent on the ambient air pressure, temperature and humidity and the temperature of surrounding surfaces (Waldron and Mackinnon, 2007) The newborn has an ability to control and balance temperature, glucose and oxygen perfusion constitute the energy triangle (Aylott, 2005) Variations in this gradual transition can result in disturbances of the neonate regulation such as neonatal hypoglycemia or hyperglycemia.

Infant B. had initially presented with an axilla temperature of 37. 1°C, normothermic according with World Health Organization (2006), whilst nursed in an open cot. To prevent variations in temperature infant B. was dressed with a vest and Babygro, a hat and wrapped with a shawl and a light blanket on top NHS (2015) and nursed away from draughts and windows to reduce heat loss by convection (Vilinsky and Sheridan, 2014). Furthermore, care was taken to reduce over exposure of the infant due to procedures, as minimize handling and promoting kangaroo care. World Health Organization <https://assignbuster.com/hypoglycaemia-in-a-term-infant-form-diabetic-mother/>

(1997) describes kangaroo care as a method to keep babies warm and improve the experience during painful procedures as heel pricks (Johnson, 2007).

In order to avoid overheat, as Trust policy, temperature was monitored every three hours by use of a tempadot placed under the axilla for 3 minutes and room temperature was set at 24-26°C. It is essential that neonates are nursed within their neutral thermal environment, defined as a temperature where a baby with normal body temperature has a minimal metabolic rate and minimal oxygen consumption (Waldron and Mackinnon, 2007).

Hypothermia can lead harmful effects as hypoglycemia, respiratory distress, hypoxia, metabolic acidosis and failure to gain weight (McCall et al, 2010). During this two night shift, Infant B. was able to maintain his temperature.

Detect pain in a neonate it's a challenge for multiple factors, a complete and efficient evaluation results in an adequate plan of interventions. As referred previously, N-PASS scale it is adopted by the Trust as a tool to assess pain in neonates. Infant B is exposed to frequent acute pain for heel pricks for evaluation of BGG and cannula in left foot. On admission pain score 0 but during the procedures pain score 1 with consolable crying, tachypneic, tachycardic and clenched Non-nutritional sucking with and without sucrose, swaddling or facilitated tucking and kangaroo care are non-pharmacological techniques adopted to minimize pain to infant B. (2016).

Non-nutritional sucking demonstrates to be effective to calm and decrease, particularly mild and moderate pain experienced by the neonate and behaviour responses to pain (Liaw et al., 2010). Baby regulates and

organizes himself and relief pain through sucking with no nutritional intake objective. Sucrose effect is mediated by endogenous opioid pathways activated by sweet taste (Gibbins and Stevens, 2001).

Beyond non-nutritional sucking, others interventions can be applied, and most of them in partnership with family and parents. Individualised developmental care to include family, explained how to reposition the baby in a comfortable way, swaddling and nesting, and during the procedure containment holding. Encourage parents to touch the neonate and talk with him. If the procedure allowed, do kangaroo care. Minimize painful procedures and clustering, discuss with parents schedules and develop a plan with team. Manipulate the environment decreasing noise and light (Sparshott, 1997).

An approach based in recognition and appreciation of parent's roles, siblings and other family member allow the nurse to recognise critical steps on the care pathway (Staniszewska et al., 2012) Maximising opportunities for communication with parents/ family increasing confidence in role as a parent and supporting parents-infant relationship.

Within the special care unit family-centred care is essential as is advocated by the unit in which the care was being received. During this episode infant B. was placed in a normal cot, because he is a term infant and able to maintain his temperature. This fact allowed his mother as well to be more closed, with no physical barriers. The poppy Steering group (2009) indicate through the needs of parents with an infant requiring neonatal support, the findings show that parents need to have the opportunity to get to know their babies, emotional support, involvement in care and decision making and to

establish effective communication with health care staff. When mother B. was able to attend the unit she appeared worried and anxious about not being with infant B. in port-natal ward. It was clear that she saw the change to a different place as a barrier. Explained that she can stay all day and night with infant B. only in handover time, she need to leave for 30 mins, was discussed the better time for cares and handling the baby for procedures. Infant B. father was not in the unit during the night, went home to rest, nursing staff were the only support available to her.

A study developed by the poppy steering group (2009), showed evidence that improved communication and involvement in their baby's care promotes positive parent-child interaction and attachment. It is important for them to have the opportunity to spend time with their baby and know them in partnership with the nurse that is responsible to provide emotional support and provide involvement in care being open to discuss decisions to be made and stablishing effective communication. Mother B. referred that the possibility to do skin-to-skin when it is appropriate for her and for her baby, helped her to cope with sensation of losing control of her baby. Create opportunities for the mom to feel participative in the care, especially during feeding time, like helping with nasogastric feeding encourage bounding and promote attachment in situations of separation between mother and infant. (Bliss, 2011)

In second night shift Infant B. remains on IV fluids, intravenous infusion rate was increased to 90ml/kg/day, as per Trust policy.

Infant B was able to maintain blood glucose levels between 3.1-4.2mmol/L. Following Trust guidelines supported by NICE (2015), glucose measurements are now twice a day after two consecutive measurements above 2.6mmol/L if infant B developed symptoms of hypoglycemia frequency will be increased. Establishing breastfeeding but followed by top up's through nasogastric tube (2mls every 2 hours) (Wight and Marinelli, 2014) given all EBM available and formula milk to achieve amount of milk that infant B needs. Intravenous fluids as decreased as feeds increased, titrating, to meet infant B intake requirements. Infant B was tolerating well his feeds, abdominal not distended and soft, minimal milky aspirates the plan is normalizing baby, decreasing amount of fluid given by intravenous line and increase feeds hoping baby can return to post-natal unit in the next day.

Screening high risk babies is other controversial intervention. A utilization of a tool to screen universally IDM after birth will allow more accurate assessments. NICE, 2013 preconize a standard approach, considering IDM healthy babies until any underlying condition appears. However Stomnaroska-Damcevski et al (2015) thinks that assessment is important and. Tools like CRIBS and SNAPPE both based in specific criteria but different between should be used.

BGL checked by test-strips provides a estimative value, vary 0.5-1mmol/l (Hay et al, 2009) laboratory enzymatic methods is the most accurate method, but results not quick enough for rapid diagnosis, delaying potential interventions and treatment. A Test-strips is important but must be confirmed by a laboratory testing, however the treatment shouldn't be

delayed in order to wait for the values, preventing neurologic damage.

(Polin, Yoder and Burg, 2001, Adamkin, 2011)

All literature consensual in therapeutic through IV dextrose bolus, and IV dextrose continuing infusion, increasing to 12.5% dextrose if values not stable (NICE, 2013; Stomnaroska-Damcevski et al ; 2015) but when start therapeutic interventions remains not clear.

Need more research about oral glucose gel, and more studies about hypoglycaemia to try to understand values of reference and what is dangerous for infant.

NICE, 2013, recommends an individualized approach to management with treatment personalized to the specific disorder, taking in mind patient safety and family preferences. Ungraded best practice statement.

The available studies are inconclusive and ambivalent about the subject of hypoglycaemia. Primary studies about blood glucose levels are old, and that fact can compromised the conclusion of the case study for up to date resources. Flexibility of sources becomes easy to get lost in the main questions. A case study it's about a particular subject and become individualized losing the relevance. However the context of the phenomenon subject of study is explored in its context with its significance and understanding (Gerrish, K. and Lacey, 2006).

This subject is something that we expect to see improving and more reflexion about practice. Diversity of literature helps contextualize different prespective through the time.

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Explain to women with insulin-treated pre-existing diabetes that they are at increased risk of hypoglycaemia in the postnatal period, especially when breastfeeding, and advise them to have a meal or snack available before or during feeds. [2008]

To test BGL, in the Trust, it is used Bedside glucose reagent test strips, according with Akalay et al (2001) this are inexpensive and practical but are not with significant variance from true blood glucose levels, especially at low glucose concentrations. Ho et al (2004) preformed a study with five different glucometers, concluding that alone they are not sensitive enough to do a diagnose, just for initial assessment, advising a laboratory analysis to be more accurate.

Tools para haver tools tinham de diferentes para cada grupo de risco (Harris, 2012)

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