Infant health assessment example

Patient Details:

Name: S. Khesa (pseudonym)

Age: 3 Months

Sex: Male

History:

Main complaint:

The patient presented to the paediatrics opinion room at 20: 00 on the 25/09/2014. He was referred from Netcare, with complaints of shortness of breath for one day; frequent loose watery stools for 3 days, without blood or mucus; and a 4 week history of a cough.

Past Medical History:

No significant medical history.

HIV exposure: None

No TB contacts

No previous admissions or surgeries.

Allergies are unknown.

The patient is not on any chronic or traditional medication.

Birth History:

The delivery of the child was a normal vaginal delivery at term, with a birth weight of 2500g, a birth length of 50cm, head circumference of 32cm. He had Apgar scores of 9/10 and 10/10. There were no complications. He was not RVD exposed.

Feeding History:

The patient is currently being exclusively breastfed. There has been no formula milk given, nor has any solids been introduced.

Development:

There is not yet any neck control. His vision and hearing are intact, as he responds to sounds his mother makes and makes eye contact with her.

Road to health Card:

All the patient’s immunisations are up to date according to history, although the 6 week vaccinations were not signed by the clinic sister.

He is growing well.

Family history:

His mother is a healthy 28 year old, she is unemployed and currently a student. His father is a healthy 30 year old who is employed. The patient has two healthy sisters aged 6 and 3 years old.

Social history:

The mother is the primary caregiver. They live in a brick house with electricity and they use an outside bucket sanitation system. They currently get an income from the father’s job as well as R300 grants for each of the children adding up to R900.

Anthropometry:

Weight: 5. 74kg

Length: 59cm

Head circumference: 43cm

Weight for age (0;-2)

Length for age (0,-2)

Weight for height (0)

Head circumference for age (2; 3)

The above anthropometry are within normal limits.

Examination on admission:

Vitals: Respiratory rate: 44 breaths/min

Heart rate: 143 beats/min

Temperature: 36. 7 â-¦ C (A high grade fever of 39. 9 â-¦ C at Netcare)

Oxygen saturation of 88% on room air.

Blood pressure was not done.

On general examination the patient seemed acutely ill, well nourished, there was no signs of dehydration, anaemia, cyanosis, oedema, jaundice or palpable lymph nodes. Ear, nose and throat examination, parotid glands, thyroid, hair, skin and nails were all normal.

On cardiovascular examination, there was no tachycardia, he was warm and well perfused the apex beat was not displaced, the first and second heart sounds were normal and no murmurs were heard.

On the respiratory examination, chest movement was symmetrical on inspection, there was no tachypnoea, however there were other signs of respiratory distress, namely nasal flaring and intercostal recessions, as well as subcostal recession. No consolidations or effusions were heard on percussion. On auscultation, there was an expiratory wheeze and prolonged expiration.

On abdominal examination, there was no distension, no scars, no depigmentation of skin and no visible peristalsis seen on inspection. There was an umbilical hernia seen on inspection. On palpation, the umbilical hernia was reducible and 1x1cm. The abdomen was soft. The liver was displaced 1cm below the costal margin, but was not enlarged. 1cm of the spleen was felt, displaced but was not enlarged. On auscultation, normal bowel sounds were heard.

On central nervous system examination, the shape of the head was normal. The patient was irritable but consolable. There was opisthotonus and fisting

noted. On palpation, the fontanelles were normal. Cranial nerves were intact. The sensory function was not examined. The motor system examination showed an increased tone in all 4 limbs. Reflexes were not examined.

There was no signs of dysmorphism other than the umbilical hernia.

Musculoskeletal and perineal examinations were normal.

Initial assessment

The patient was well nourished with a normal anthropometry, acutely ill, in respiratory distress.

Vitals: Respiratory rate: 44 breaths/min (within normal range for a 2 month to 1 year old child, <50 breaths per minute)

Heart rate: 143 beats/min (within normal range for a 2 month to 1 year oldchild, < 160 beats per minute)

Temperature: 36. 7 â-¦ C (Normal for the age of the child. A high grade fever of 39. 9 â-¦ C at Netcare)

Oxygen saturation of 88% on room air. (Hypoxic if <90-92%)

Blood pressure was not done, normal values for this child would be <110/<160

The fever at Netcare could be because of an infection, the child was probably given paracetamol before referral which is why the temperature seemed

normal on admission. The patient was hypoxic due to an infection, most likely of respiratory cause.

The history of coughing for 4 weeks highly indicates a respiratory infection. The loose, watery stools can be related to the respiratory infection, especially if it is a viral cause. The episode of regurgitation is normal for the child’s age.

The examination findings of signs of respiratory distress (nasal flaring and intercostal and subcostal recessions) and on auscultation, the expiratory wheeze and prolonged expiration, is indicative of Bronchiolitis. This is usually caused by a virus, especially the Respiratory Syncytial virus in a child of the age of 3 months.

The initial investigations done were blood glucose and a urine dipstick test, which did not show anything abnormal.

Working diagnosis: Bronchiolitis.

Differential diagnosis: Pneumonia.

Special investigations

Blood glucose	4. 4mmol/L. Done to exclude hypoglycaemia and hyperglycaemi

	a. Any illness can cause a stress response which will increase blood glucose.
Urine dipstick	Nothing abnormal was discovered. To exclude kidney dysfunction or filtering abnormalities or urinary infections.
Urine MC&S	Done to exclude a urinary tract infection. Here leukocytes were detected, pointing to the presence of a

	urinary tract infection.
Lumbar puncture	Done to exclude meningitis as it can present atypically in young children. Nothing abnormal was found.
FBC and U&E (urea and electrolytes)	Done to check for infections or electrolyte abnormalities that should be followed up and treated.
	On admission: Potassium was high 6. 8 (Normal values: 3. 7-5.

2). Corrected calcium was very low 0. 96 (Normal 2. 12-2. 57). Magnesium was low 0. 76 (Normal 1. 6-2. 5). Phosphate was high 2. 85 (1-1. 18). Urea and creatinine were high, 8. 4 and 107 (Normal 1. 4-5. 7 and 30-48)

The following day: Corrected calcium was 0. 96, magnesium was 0. 72. Both were low.

Reference ranges

	according to laboratory.
	Done to assess for TB or pneumonia (consolidation), hyperinflation and any other pathology.
Chest X-ray	The chest x-ray showed increased bronchovascular markings, increased AP diameter and air retrosternally. There was an absence of any other pathology.
Blood gas	Done to exclude

	acidosis, electrolyte disturbances quickly.
	02/10/2014: Corrected calcium 0, 71 which was very low.
Parathyroid hormone level	Results still pending 03/10/2014. To exclude any parathyroid hyperfunction leading to decreased serum calcium
Renal ultrasound	Results still pending 03/10/2014. To exclude any kidney abnormalities

or ureter abnormalities in anatomy as urinary tract infection is uncommon in male infants. This will also help in finding the cause of the persistent hypocalcaemia .

Full clinical assessment

Assessment of the vitals, after admission the patient had multiple temperature spikes, all indicative of a low grade fever. The oxygen saturation was > 92% but the patient was on additional oxygen. There was no tachypnea or tachycardia.

The patient had significant respiratory signs such as the expiratory wheezing, prolonged expiration and signs of respiratory distress (nasal flaring, use of accessory breathing muscles). The liver and spleen was displaced downwards and there were also signs of hyperinflation on the AP chest x-ray such as more than 9 posterior ribs visible, flattening of the diaphragm. On lateral chest x-ray, there was increased air behind the

sternum. These signs point to a diagnosis of bronchiolitis. The patient is also the appropriate age for this illness.

He had hyperkalaemia which was not treated because it was not clinically visible.

He had hypocalcaemia, which was manifested by the increased tone and neuromuscular irritability shown as opisthotonus. There were no other signs of hypocalcaemia. It could point to a hypoparathyroidism, or not enough intake of calcium, (which was excluded because the child is exclusively breast fed on demand). The parathyroid hormone levels results are not available as yet. Because the phosphate and magnesium was also low, this could be a clue to a renal origin, renal sonar results are not available as yet.

He also had a urinary tract infection according to the urine MC&S which showed raised leukocytes. The patient is male and a urinary tract infection is abnormal in the small boy. This also raises the question of a possible kidney or ureter abnormality, renal sonar results are not available as yet.

Problem List and management

Bronchiolitis	This was managed with a 3 rd generation cephalospor in antibiotic, (Ceftriaxone

), 300mg intravenously, 12 hourly for 7 days, to cover both gram negative and gram positive bacteria, if this is a bacterial infection. It also helps to prevent a secondary bacterial infection, if the infection was viral. This drug also crosses the brain-blood barrier to

cover
possible
meningitis,
as the
patient had
opisthotonu
s which
could have
also
actually
been neck
stiffness.
The dose of
the drug
was almost
double the
usual dose
(30mg/kg=
172mg),
this is to
ensure that
high enough
levels cross
the blood-
brain barrier
to treat

meningitis.

Salbutamol nebulizer was given to relieve the expiratory wheeze, 4 hourly, a ratio of 1: 1 with normal saline.

Extra fluids were given intravenously and the feeds were continued per mouth as the patient did not have tachypnoea, as supportive

	measures.
Urinary tract infection	This was covered by the 3 rd generation cephalospor in (Ceftriaxone) as well. Paracetamo l was given as needed when the temperatur e got to levels higher than 37. 5 â-¦ C. A renal ultrasound was done to exclude any anatomical abnormaliti es in the

	kidney and ureters.
Hypocalcaemia	Calcium gluconate was given, a stat dose of 2. 5ml intravenously.
	Calcium carbonate was given as the hypocalcaemia was deemed as severe, 1 tablet, per os, twice a day for one week.
	Vitamin D was given to help with the

intestinal absorption of the calcium.

A renal ultrasound was done to exclude any anatomical abnormalities in the kidney.

Progression

The bronchiolitis was successfully cured, the lungs were clear on examination as at 3/10/2014. He was feeding well, and his vitals were stable.

The urinary tract infection was also successfully cured, there was no fever.

Before the commencement of the calcium gluconate and calcium carbonate treatment, there was an episode of apnoea and tetany. There was also a history given by the mother of shaking, which are possibly convulsions. The apnoea was reversed with a successful resuscitation of the child. The tetany and convulsions was also relieved with the calcium gluconate and calcium carbonate.

Results of the parathyroid hormone level and the renal ultrasound result are still pending. This was done to find the cause of the hypocalcaemia.

Other Aspects

Bronchiolitis

Bronchiolitis is the inflammation of the bronchioles. It is caused by a number of viruses such as, Human Metapneumovirus, Respiratory Syncytial virus (the most common cause) and Rhinovirus. The incidence of bronchiolitis is usually around 5-6 months in developing countries and at 2-3 months if age in developed countries. It is transmitted by droplet spread. The Respiratory Syncytial virus (RSV) leads to oedema of the mucosa and can lead to bronchiole desquamation of the epithelium.

Bronchiolitis usually presents with a chest infection, there is usually tachypnea, coughing and a low grade fever. There can be an expiratory wheeze, prolonged expiration and an increased anterior-posterior diameter of the chest caused by air-trapping. [1]

The diagnosis is usually clinical, but RSV can be cultured from secretions or an ELISA test which will detect the RSV IgG antigen in the blood. The ELISA test (enzyme-linked immunosorbent assay) works by a plate with RSV antigens that bind RSV antibodies. Control samples are added for comparison. A horseradish peroxidase is added, which binds to the RSV antibodies. The antibodies are catalysed by the horseradish peroxidase to produce a blue colour that changes to yellow after adding another solution. The shade of yellow shows the amount of RSV IgG. [2]

A study has postulated that exposure to the RSV bronchiolitis below the age of 1 year, can possibly increase the chances of that child developing asthma by the age of 7. This is thought to be because of allergic sensitization due to the virus, which then causes a hyperreactivity of the small and medium airways. It is thought that RSV infection is an important independent risk factor in the development of asthma by changing the immune response or damaging the growing lung tissues. The RSV infection may cause a change of T-helper cells type 2 to the type 1 T-helper cells, causing IgE antibodies to be produced at a lower level since their production depends on the type 2 cells. If IgE antibodies aren't produced at a young age, this leads to an immune response to normal environmental factors as the individual has not yet been sensitized to certain things, by the type 2 T-helper cells, leading to an allergy. [3]

[366 words]

Hypocalcaemia

Hypocalcaemia can be caused by a number of things. These include inadequate calcium intake or increased loss, hypoparathyroidism, rickets, or kidney disease which can lead to hyperphosphataemia. The clinical presentation includes neuromuscular irritability, convulsions, cardiac changes and tetany (spasms of the muscles), carpopedal spasms, laryngeal spasms which can lead to apnoea. There can be a numbness in the extremities. The treatment of this is calcium gluconate with oral supplements afterwards if needed. [1]

Hypocalcaemia caused by hypoparathyroidism occurs because there is no parathyroid hormone to regulate the calcium in the blood. It regulates the levels of calcium by stimulating osteoclast activity and increasing bone resorption to release the calcium from the bones into the extracellular fluid when the calcium in the extracellular fluid is low. It also causes the kidneys to decrease excretion of calcium from the distal tubules of the nephron when calcium in the extracellular fluid is low. Parathyroid hormone causes increased intestinal absorption of calcium indirectly by changing vitamin D to its active form Calcitrol, this in turn causes increased intestinal absorption of dietary calcium.

Primary hypoparathyroidism is characterised by low concentration of parathyroid hormone and a low calcium level.

In pseudohypoparathyroidism, the concentration of parathyroid hormone is elevated as a result of resistance to it caused by mutations of the parathyroid hormone receptors and a low calcium level. [4]

Hypocalcemia in paediatrics presents with neuromuscular irritability and decreases muscle contractility. Hypocalcaemia lowers the threshold of excitation of neurons, causing them to be very excitable. This happens in sensory and motor nerves, hypocalcaemia causes many symptoms such as tetany and convulsions in children.

Tetany is caused by the increased neuronal excitability, not muscular excitability, which is actually decreased because hypocalcaemia leads to decreased neurotransmitters at the neuromuscular junction, thus muscular contraction is inhibited. The increased excitability of the neurons overpowers

the muscular contraction inhibition. Heart function can also be decreased because of the inhibited muscle contraction.

Hypocalcaemia in this patient can be caused by different things the causes of infant and child hypocalcaemia include hypoparathyroidism, vitamin D defiency or abnormality or hyperphosphataemia.

Liver disease can decrease the activation of vitamin D.

Increased phosphate, as in this patient, can be caused by a number of things such as improper mixing of formula leading to increased intake (not applicable to this patient because he is being exclusively breastfed) or even renal failure.

Children can present with inability to feed, lethargy, vomiting, but they can also be asymptomatic. On history, convulsions or twitching can occur.

Hypocalcaemia can be treated with supplementation such as calcium gluconate, but the underlying disease should be treated once the child is stabilised. [5]

[438 words]

References

1. Wittenberg, DF. *Coovadia's paediatrics and child health* , 6th ed. South Africa: Oxford University Press; 2009.
2. Abcam plc. *Anti-Respiratory syncytial virus (RSV) IgG Human ELISA Kit (ab108765). http://www. abcam. com/respiratory-syncytial-virus-rsv-igg-human-elisa-kit-ab108765. html (accessed 4 October 2014).*

3. Sigurs N, Bjarnason R, Sigurbergsson F. Respiratory syncytial virus bronchiolitis in infancy is an important risk factor for asthma and allergy at age 7. *American Journal of Respiratory and Critical Care Medicine* 2000; 161(5): 1501-1507.

4. Gonzalez-Compoy, JM. *Hypoparathyroidism. http://emedicine. medscape. com/article/122207-overview (accessed 4 October 2014).*

5. Sinha, S. *Pediatric hypocalcemia. http://emedicine. medscape. com/article/921844-overview (accessed 4 October 2014).*