Reflection of a paediatric patient presenting with vomiting and lethargy (KSA's covered: Capability 1, 2,4,5,6,7,8)

Introduction

A Paramedic is an autonomous practitioner who has the knowledge, skills, and clinical expertise to assess, diagnose, and manage patient care whether through referral to other health care practitioners, admission to hospital or discharging at home (college of paramedics, 2017). Whilst working as a Paramedic within Primary care, I regularly assess paediatric patients of which I have discussed and critically analysed in this essay. Critical analysis and reflective practice is important in the development of paramedic practice allowing practitioners to learn from mistakes and using evidence based practice to improve the outcome of patient care and wellbeing (Mezirow, 1998).

Clinical Case

Patient A was a 10-year-old white British female who was seen face to face on a same day urgent appointment following a 12-hour history of vomiting and is now pale and lethargic. A comprehensive patient history was taken from both Patient A and her mother as using parents as historians is an important element in paediatric history taking as stated by Bier (1949) "a smart mother often makes a better diagnosis than a poor doctor". At the age of 10 however Patient A was mature enough to convey a good history and symptoms (Miall et al, 2016).

It is important to ascertain the clinical history first as it allows you to focus on relevant areas of physical assessment and sets the direction of clinical thinking (Bickley 2009). Initial Consent for physical assessment was gained from Patient A as even through Patient A was under the age of 18 (the age at which one is legally considered an adult in the UK (DoH, 2009), a child has a right to be treated as an individual when appropriately able to provide consent (Miall et al, 2016). The Department of Health of the United Kingdom (DoH) has stated that there is a 'general legal and ethical principle that valid consent must be obtained before starting treatment or physical investigation' (DoH, 2009).

Differentials

Following on from examination the following differentials were considered.

Viral Gastroenteritis: A generally self-limiting viral illness lasting 3 - 7 days, gastroenteritis involves inflammation of the gastrointestinal tract and is most commonly seen in younger children (Longmore et al, 2010). The most common symptoms are a low-grade fever <38^{0}C, sudden onset of watery diarrhoea that can last 5-7 days and vomiting that should resolve within 3 days (NICE, 2015).

Urinary tract infection: Primarily bacterial infection of the urinary tract and bladder which can cause dysuria, polyuria, fever, malaise, mild abdominal pain and in the young nausea and vomiting (Longmore et al, 2010).

Early onset Diabetic Ketoacidosis: Commonly seen in insulin controlled diabetics, early onset Diabetic ketoacidosis (DKA) can be indicated by a hyperglycaemia, ketonuria, polyuria, polydipsia, lethargy, nausea and vomiting, abdominal pain and reduced level of consciousness (WHO, 2006).

Clinical Examination

A detailed examination of the abdomen was conducted using an inspection, auscultation, palpation, and percussion approach (Bickley, 2009). I informed Patient A of what I would like to do and how the assessment would be performed and asked her to inform me of any pain or discomfort using age appropriate language. In paediatrics the focus of the examination changes with the child's age and understanding, and in older children it is important to involve them in decision making and understand their concerns (Miall et al, 2016). Examination should always be conducted with the child in an undressed state (Bickley, 2009) and a chaperone should be present when examining a child.

The child's mother reported that over the last week her daughter had been lethargic and unable to attend extracurricular activities. The child herself added that she had been feeling thirsty and had been passing urine more frequently.

It was found that Patients A's blood glucose was raised at 11.8 mmol/L outside the normal values of <6.9 mmol/L expected in a non-diabetic patient. Diabetes is common and effects 1 in 500 children. There should be a high index of suspicion of diabetes if the patient presents with a random glucose reading of >11.1 mmol/L or a fasting glucose of >7.0 mmol/L (Douglas et al, 2005). It has been well documented that idiopathic hyperglycaemia can occur during critical illness known as stress hyperglycaemia (NICE, 2015a) and a standalone finger prick glucose reading of >11.1 mmol/L cannot be used a diagnosis but as a reference for referral (Turner and Wass, 2009).

Pathophysiology

Symptoms indicative of urinary tract infection (UTI) are dysuria, polyuria with mild fever and loin pain. However, in the young nonspecific symptoms may predominate such as nausea, vomiting, malaise and confusion (Longmore et al, 2010). UTI's are very common in children with 3-5% of girls affected, and may be diagnosed using urinalysis testing. Normal urinalysis has a strong negative predictive value for UTI even if diagnosis seems clinically apparent, further investigation and differential diagnosis must be sought (Thalange et al, 2006).

Gastroenteritis is a highly transmissible disease and is commonly passed from person to person via the oral route, with close contact to an infected person all that's needed for transmission. Patient A lived with both parents and a younger brother and no one so far had succumbed to the illness though the incubation period for gastroenteritis is 12 hours from contamination so it may have been too early to use this as a differential (Greaves and Porter, 2007).

Early stages of diabetic ketoacidosis can be mistaken for gastroenteritis (Thalange et al, 2006) with similarly, often vague symptoms seen in children suffering from both conditions. Considered as a medical emergency, diabetic ketoacidosis (DKA) occurs when there is an inadequate amount insulin in the body, therefore glucose cannot be utilised for the use of energy. Ketones are released as body fat is metabolised as an alternative source of energy and

the condition will present with dehydration, elevated respiratory rate, reduced consciousness and elevated blood and urine ketones and glucose levels (WHO, 2006)

Management

Patient A was displaying symptoms that may be attributable to all the above differentials but following full examination and history I had a high index of suspicion that this was the initial presentation of type one diabetes (T1DM) and diabetic ketoacidosis (DKA) Following local guideline which suggests any patient with a suspicion of diabetes (Polyuria, polydipsia, weight loss, lethargy) and a blood glucose >11mmol/l or glycosuria should be admitted to the local Paediatric emergency department for further assessment (UHB 2021).

Learning point

1 in 5 children experienced delay in diagnosis or misdiagnosis on first encounter, with subsequent 80% then presenting in DKA but if the child has a family history of T1D they will always be diagnosed on first presentation (Ursher-Smith *et al.,* 2011)

It has been found that all the children seen presented with at least one of the 4 common symptoms (polydipsia, polyuria, lethargy, weight loss) , 97.7% presented with at least two symptoms , 79.3% presented with 3 symptoms and 50.6% presented with all four symptoms. Secondary to the four most common symptoms, vomiting and abdominal pain was noted as initial presentation. Studies also show that a child will more be at higher risk of DKA following an infection or febrile episode (Ursher-Smith *et al.,* 2013)

Due to the initial subtlety of symptoms, classic symptoms are difficult to distinguish from other acute illness. Specifically, when dealing with children under the age of 5 years as due to language skills; they cannot describe their symptoms and how they feel. This might contribute to why under 5's are three times more likely to present in DKA on initial presentation and again three times more likely if under 2. Other explanations for this statistic are that under 5's will decompensate quicker than an older child due to dehydration and acidosis. Also contributing to the fact that under 5's are notoriously difficult to gain a urine sample on demand excluding a urine infection; one of the leading misdiagnosis on first presentation, which would highlight possible glucose in urine (NICE., 2015).

Conclusion:

The clinician should have a higher index of suspicion of T1DM and early signs of DKA in younger children particularly children under the age of 5. All children presenting with at least one of the "4 T's" (tired, thirst, toilet, thinner" should have urinalysis and a finger prick blood glucose test done same day as presentation.

*If reflecting on a particular patient, it may be useful for your clinical supervisor to attach the patient notes here or write them out

Patient A Examination Notes:

PC: 12-hour history of vomiting and lethargy

HPC: Mum states patient has been generally lethargic over the last week and has been too tired to attend after school activities. Patient has been appearing pale, reduced food intake but increased fluid intake.

PMH: Fit and well, no previous medical history apart from the occasional coryzal symptoms, Born at 39 weeks, no problems antenatal or postnatal. No previous hospital admissions overnight

SHx: Lives with mother and father and younger sister (7 years old). No social or support worker involvement. Enjoys going to school and attends extra circular sport activities (netball and gymnastics). No recent foreign travel

FHx: Aunty and Grandmother are insulin dependent Type 1 diabetics

Medications: No medications, Immunisations up to date (non-given in the last 2 weeks), NKDA

On Examination:

Seen with mother (name), patient walked into the room independently, appears pale and lethargic but engaging. No signs of distress / pain

Observations:

Temp 37.2 , R/R 22, H/R 106, SPO2 99% , BP supine 105/64 , BP standing 100/67 , Blood Glucose 11.8 mmol/ L

Urine Dip + 1 ketone only

NEURO: FAST -VE, no neuro deficit, no balance deficit, all reflexes intact, PEARL, no visual deficit, no photophobia, no headache, no witnessed seizure activity, Kernig's Sign -VE, Brudzinski's Sign -VE

CVS: no chest pain, no palpitations, no dizziness, some light headedness when standing, peripheries normothermic, no peripheral oedema or cyanosis, all pulses present and normal strength, H/S – no additional sounds, no murmur

RESP: chest clear, equal bilateral air entry, no crackles, no wheeze, no consolidation, no SOB, no increased WOB, no cough, speaking in full sentences, no central cyanosis

ABDO: soft, no distension, no pain on palpation, no guarding, no palpable masses, murphy's sign -VE , PSOS sign -VE . passing urine – unable to describe colour or smell, no haematuria, not eaten for 24 hours but has been able to keep fluid down. D&V started simultaneously, no haematemesis, no PR or PV bleed, global active B/S, patient complaining of mild cramping prior to vomiting but eases after

ENT and SKIN: no raised lymph nodes, throat and ears clear, no reddening or pain, no coryzal symptoms, no jaundice, conjunctivae normal pallor, pale, skin dry , mucosa dry , signs of developing dehydration . no RASH

PGALS: nil joint pain

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