

Unusual Presentations of Uncommon Conditions

Lucy's case book issue 2 - sepsis and septic shock

Overview

Sepsis is responsible for ~37,000 deaths a year in England, with 123,000 cases annually¹. Sepsis can be difficult to spot and good GPs "Miss It". Sepsis is defined as "life threatening organ dysfunction caused by a dysregulated host response to an infection²" and is a time critical medical emergency. The mortality of Septic Shock increases 8% with every hour that passes without initiation of iv antibiotics³. If recognised early it can be treated effectively with oxygen, fluids, and antibiotics⁴.

Signs and Symptoms

Infection is a common cause of ill health but there are few pathognomonic signs or symptoms specific to deteriorating infection or sepsis. NICE list symptoms that may alert to the possibility but over triage significantly in most locations. (Appendix A).

Assessing Adults

The presence of sepsis is most commonly indicated by a history of deterioration in the presence of possible infection, clinical judgement and abnormal physiology. The assessment of physiology should include respiratory rate, blood pressure/perfusion, oximetry, pulse and temperature, with a judgement made about cognition. We know that the presence of abnormal respiratory rate, reduced blood pressure and altered cognition are the best predictors of sepsis particularly in combination. In hospital abnormal values for these variables are assessed against a NEWS Score using the table below to calculate an aggregated score. The predictive value of NEWS in Primary care is yet to be determined, but we know that patients presenting in the ED with a NEWS score of 3 or less have a low chance of having sepsis, and that a score of 5 or above is strongly suggestive of sepsis in the presence of probable infection.

Chart 1: The NEWS scoring system

Physiological parameter	Score						
	3	2	1	0	1	2	3
Respiration rate (per minute)	≥8		9-11	12-20		21-24	≥25
SpO ₂ Scale 1 (%)	≤91	92-93	94-95	≥96			
SpO ₂ Scale 2 (%)	≤83	84-85	86-87	88-92 ≥93 on air	93-94 on oxygen	95-96 on oxygen	≥97 on oxygen
Air or oxygen?		Oxygen		Air			
Systolic blood pressure (mmHg)	≤90	91-100	101-110	111-219			≥220
Pulse (per minute)	≤40		41-50	51-90	91-110	111-130	≥131
Consciousness				Alert			CVPU
Temperature (°C)	≤35.0		35.1-36.0	36.1-38.0	38.1-39.0	≥39.1	

For GPs this amounts to identifying a deteriorating patient with possible/probable infection using clinical judgement and augmenting that decision making by assessing physiology. When a decision is

made to admit this should be done by the clinician calling 999, stating that they “Suspect Sepsis” and being prepared to give the NEWS Score or the abnormal physiology of concern.

In patients where sepsis is not suspected but infection is a possible or probable cause of being unwell they should have some recorded assessment of respiratory rate/effort, perfusion, and cognition. They or their carers should also receive specific safety netting as to the signs of sepsis, and ideally an age appropriate Sepsis leaflet.

Assessing Children

This can present a significant clinical challenge. Children’s physiology can vary wildly according to age and their response to infection. There is no standardisation of Paediatric Early Warning Scores as yet and the values they contain are validated against different cohorts of children to those seen in Primary care. There is also no standard paediatric definition of what determines the presence or absence of sepsis.

None of this helps the General Practice clinician. Clinical assessment should include judgement as to the history and unusual signs, including rashes abnormal alertness, clinician and parental concern. It should also contain a record of an assessment of physiology, particularly their respiratory rate/distress, perfusion (capillary refill, pulse rate) and level of cognition/social interaction. In many children this may be represented as negative findings, (no respiratory distress, pink and playing with toys, running around room or smiling appropriately).

Temperature alone is a poor predictor of wellness. The more unwell the child the more formal the assessment may need to be, particularly where the judgement is to keep the child at home.

Safety netting for children needs to be better than “if they get worse come back” and should include some indication of what worse looks like. This should be supported by an age appropriate leaflet.

Verbal advice for Parents of Children with Infection

Your child has xxx infection and is likely to improve with/without treatment. Very occasionally they can get significantly worse, signs of getting worse can include becoming

- Increasingly breathless,
- Pale and clammy “the colour someone goes when they are about to be sick”
- Unnaturally drowsy or unresponsive
- Not passing urine in the previous 12 hours.

If these occur then you should consider getting your child assessed as a matter of urgency.

Summary

- When assessing any patient with infection consider if there are features that might suggest sepsis and document their presence or absence
- Assessment of Respiratory Rate, Blood Pressure/perfusion and cognition should all be assessed and recorded for all patients with infection
- National Early Warning Score (2017) should be considered to be the bench mark for abnormal values in adults.
- Paediatric Early Warning scores and NICE Guidance vary in their contents and values but all provide an indication of abnormal values. Clinical and parental judgement remains a strong predictors
- Oximetry should be recorded using age appropriate devices and probes
- Escalation to ambulance or other services should be done by the clinician and must include the phrase “Suspected Sepsis” and give a NEWS score in adults and abnormal physiological findings in children
- Safety Netting should be sepsis specific supported by age appropriate leaflets.

Further Reading

[E-Learning for Health Sepsis Modules](#)

RCGP Sepsis: Guidance for GPs

References

1. Hospital Episode Statistics: Health and Social Care Information Centre. 2015. <http://www.parliament.uk/business/publications/written-questions-answers-statements/written-question/Commons/2015-09-16/10526/>.
2. Singer M, Deutschman CS, Seymour CW, et al. The Third International Consensus Definitions for Sepsis and Septic Shock (Sepsis-3). *Jama* 2016; **315**(8): 801-10.
3. Kumar A, Roberts D, Wood KE, et al. Duration of hypotension before initiation of effective antimicrobial therapy is the critical determinant of survival in human septic shock. *Critical care medicine* 2006; **34**(6): 1589-96.
4. Daniels R. Surviving the first hours in sepsis: getting the basics right (an intensivist's perspective). *The Journal of antimicrobial chemotherapy* 2011; **66 Suppl 2**: ii11-23.

Appendix A NICE Guidance

Table 1 Risk stratification tool for adults, children and young people aged 12 years and over with suspected sepsis

Category	High risk criteria	Moderate to high risk criteria	Low risk criteria
History	Objective evidence of new altered mental state	History from patient, friend or relative of new onset of altered behaviour or mental state History of acute deterioration of functional ability Impaired immune system (illness or drugs including oral steroids) Trauma, surgery or invasive procedures in the last 6 weeks	Normal behaviour
Respiratory	Raised respiratory rate: 25 breaths per minute or more New need for oxygen (more than 40% FIO ₂) to maintain saturation more than 92% (or more than 88% in known chronic obstructive pulmonary disease)	Raised respiratory rate: 21–24 breaths per minute	No high risk or moderate to high risk criteria met
Blood pressure	Systolic blood pressure 90 mmHg or less or systolic blood pressure more than 40 mmHg below normal	Systolic blood pressure 91–100 mmHg	No high risk or moderate to high risk criteria met
Circulation and hydration	Raised heart rate: more than 130 beats per minute Not passed urine in previous 18 hours. For catheterised patients, passed less than 0.5 ml/kg of urine per hour	Raised heart rate: 91–130 beats per minute (for pregnant women 100–130 beats per minute) or new onset arrhythmia Not passed urine in the past 12–18 hours For catheterised patients, passed 0.5–1 ml/kg of urine per hour	No high risk or moderate to high risk criteria met
Temperature		Tympanic temperature less than 36°C	
Skin	Mottled or ashen appearance Cyanosis of skin, lips or tongue Non-blanching rash of skin	Signs of potential infection, including redness, swelling or discharge at surgical site or breakdown of wound	No non-blanching rash

Table 2 Risk stratification tool for children aged 5–11 years with suspected sepsis

Category	Age	High risk criteria	Moderate to high risk criteria	Low risk criteria
Behaviour	Any	Objective evidence of altered behaviour or mental state Appears ill to a healthcare professional Does not wake or if roused does not stay awake	Not behaving normally Decreased activity Parent or carer concern that the child is behaving differently from usual	Behaving normally
Respiratory	Any	Oxygen saturation of less than 90% in air or increased oxygen requirement over baseline	Oxygen saturation of less than 92% in air or increased oxygen requirement over baseline	No high risk or moderate to high risk criteria met
	Aged 5 years	Raised respiratory rate: 29 breaths per minute or more	Raised respiratory rate: 24–28 breaths per minute	
	Aged 6–7 years	Raised respiratory rate: 27 breaths per minute or more	Raised respiratory rate: 24–26 breaths per minute	
	Aged 8–11 years	Raised respiratory rate: 25 breaths per minute or more	Raised respiratory rate: 22–24 breaths per minute	
Circulation and hydration	Any	Heart rate less than 60 beats per minute	Capillary refill time of 3 seconds or more Reduced urine output For catheterised patients, passed less than 1 ml/kg of urine per hour	No high risk or moderate to high risk criteria met
	Aged 5 years	Raised heart rate: 130 beats per	Raised heart rate: 120–129 beats per	
		minute or more	minute	
	Aged 6–7 years	Raised heart rate: 120 beats per minute or more	Raised heart rate: 110–119 beats per minute	
	Aged 8–11 years	Raised heart rate: 115 beats per minute or more	Raised heart rate: 105–114 beats per minute	
Skin	Any	Mottled or ashen appearance Cyanosis of skin, lips or tongue Non-blanching rash of skin		
Other	Any		Leg pain Cold hands or feet	No high or moderate to high risk criteria met

Table 3 Risk stratification tool for children aged under 5 years with suspected sepsis

Category	Age	High risk criteria	Moderate to high risk criteria	Low risk criteria
Behaviour	Any	No response to social cues Appears ill to a healthcare professional Does not wake, or if roused does not stay awake Weak high-pitched or continuous cry	Not responding normally to social cues No smile Wakes only with prolonged stimulation Decreased activity Parent or carer concern that child is behaving differently from usual	Responds normally to social cues Content or smiles Stays awake or awakens quickly Strong normal cry or not crying
Respiratory	Any	Grunting Apnoea Oxygen saturation of less than 90% in air or increased oxygen requirement over baseline	Oxygen saturation of less than 91% in air or increased oxygen requirement over baseline Nasal flaring	No high risk or moderate to high risk criteria met
	Under 1 year	Raised respiratory rate: 60 breaths per minute or more	Raised respiratory rate: 50–59 breaths per minute	
	1–2 years	Raised respiratory rate: 50 breaths per minute or more	Raised respiratory rate: 40–49 breaths per minute	
	3–4 years	Raised respiratory rate: 40 breaths per minute or more	Raised respiratory rate: 35–39 breaths per minute	
Circulation and hydration	Any	Bradycardia: heart rate less than 60 beats per minute	Capillary refill time of 3 seconds or more Reduced urine output For catheterised patients, passed less than 1 ml/kg of urine per hour	No high risk or moderate to high risk criteria met
	Under 1 year	Rapid heart rate: 160 beats per minute or more	Rapid heart rate: 150–159 beats per minute	
	1–2 years	Rapid heart rate: 150 beats per minute or more	Rapid heart rate: 140–149 beats per minute	
	3–4 years	Rapid heart rate: 140 beats per minute or more	Rapid heart rate: 130–139 beats per minute	
Skin	Any	Mottled or ashen appearance Cyanosis of skin, lips or tongue Non-blanching rash of skin		Normal colour
Temperature	Any	Less than 36°C		
	Under 3 months	38°C or more		
	3–6 months		39°C or more	
Other	Any		Leg pain Cold hands or feet	No high risk or high to moderate risk criteria met

This table is adapted from NICE's guideline on [fever in under 5s](#).

Additional Resources

<http://www.rcgp.org.uk/clinical-and-research/toolkits/sepsis-toolkit.aspx>