

Recognition and management of toxic shock syndrome (TSS)

Author: Lucy Radevsky, Frances Howsam, Geetha Fonseka, Sally Curtis and the BSUH microbiology team (edited by M.Lazner)

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- Toxic shock syndrome (TSS) is a severe acute superantigen-mediated condition, caused by toxin-producing strains of *Staphylococcus aureus* and *Streptococcus pyogenes*.
- Infection with *S. aureus* produces classical TSS, whereas *S. pyogenes* causes a modified form of TSS known as either streptococcal TSS or, more recently, toxic-shock-like syndrome (TSLs). This is seen particularly with childhood varicella infection.
- TSS should be considered in **any patient with fever and hypotension, whether a rash is obvious or not**. It is often accompanied by a mild prodrome of myalgia and GI upset progressing to agitation, confusion and lethargy.
- Milder versions do occur.

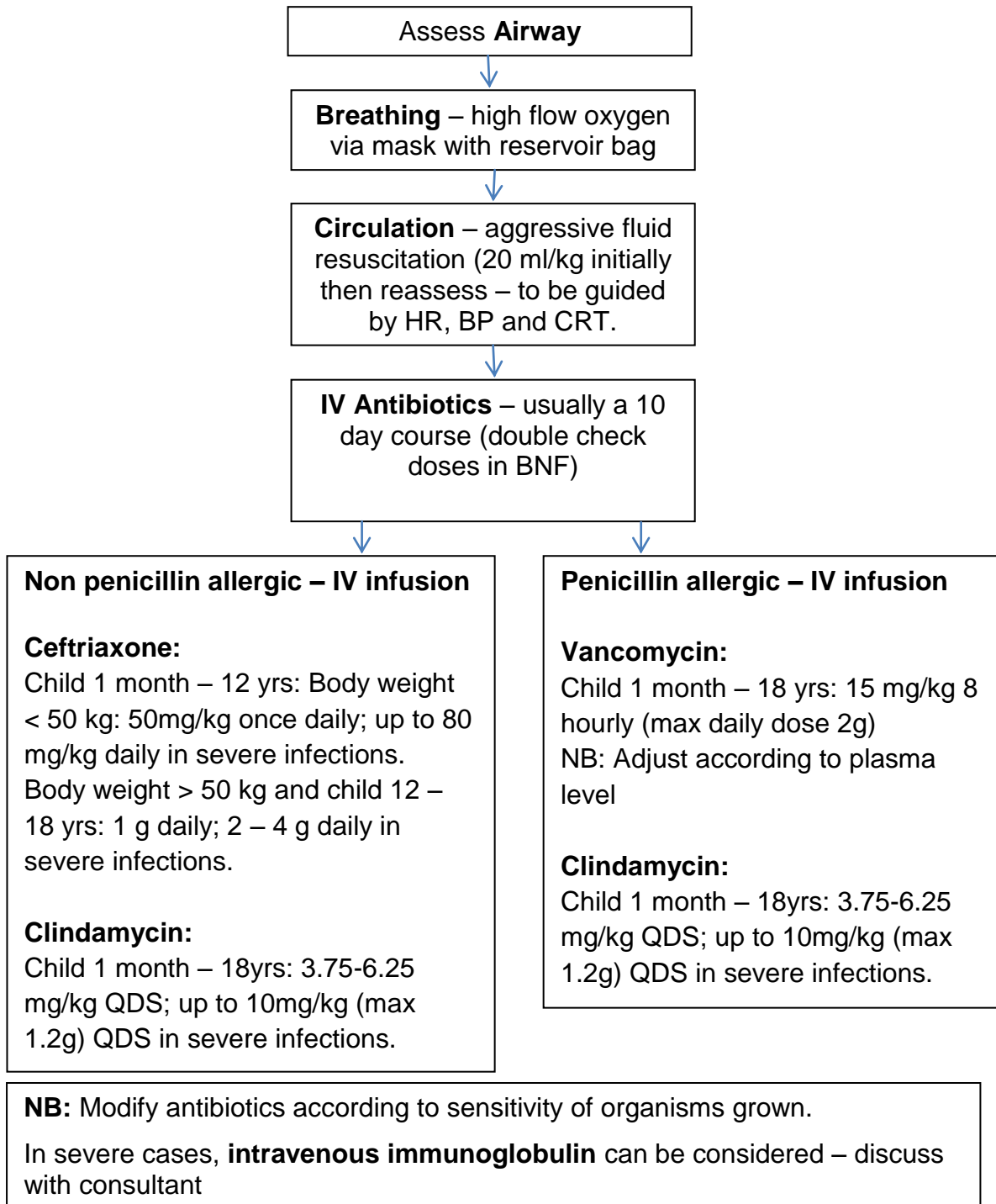
Table 1: Toxic Shock Syndrome – Case Definition¹

I	Fever:	≥ 38.9C
II	Rash:	Diffuse macular erythroderma ('sunburn')
III	Hypotension:	Systolic BP ≤ 5 th percentile for age (under 16yrs) – see table 2 or systolic BP ≤ 90mmHg (over 16 yrs) or orthostatic hypotension, dizziness or syncope
IV	Multisystem dysfunction:	at least three: <ul style="list-style-type: none"> A. Gastrointestinal: vomiting or diarrhoea at onset of illness. B. Muscular: severe myalgias, or serum creatinine phosphokinase (CPK) ≥ twice the upper limit of normal. C. Mucous Membranes: vaginal, oral or conjunctival hyperaemia. D. Renal: Creatinine ≥ twice the upper limit of normal or pyuria (≥ 5 leucocytes per high power field) in the absence of urinary tract infection. E. Hepatic: Total serum bilirubin or transaminase level ≥ twice the upper limit of normal. F. Haematologic: Platelets ≤ 100 G. Central Nervous System: disorientation or alteration in consciousness but no focal neurological signs at a time when fever and hypotension are absent.
V	Desquamation:	1 to 2 weeks after the onset of the illness (typically palms and soles)
VI	Evidence against an alternative diagnosis:	If obtained: negative cultures of blood, throat or CSF ² ; absence of a rise in antibody titres to the agents of leptospirosis, measles or Rocky Mountain spotted fever.

¹ 'Confirmed' case meets all six criteria; 'probable' case meets 5 of the 6.

² Blood culture may be positive for *S. Aureus*

What should be done if TSS is suspected?



Additional management:

- Blood tests: blood cultures, FBC, U+Es, LFTS, Bone profile, CRP, coagulation screen, CPK; Other: throat swab
- Maintenance fluid following resuscitation fluids
- Reassess the wound / burns site - Identify and decontaminate the site of toxin production. Drain or debride the area, remove foreign material and irrigate copiously.
- Admit to HDU for close monitoring

Notes

Table 2 – fifth centile systolic BP according to height percentile for children 1 – 17 years

Age, Yrs	Fifth Percentile Systolic Blood Pressure, Percentile for Height									
	5th		25th		50th		75th		95th	
	M	F	M	F	M	F	M	F	M	F
1	62	66	65	68	67	68	70	71	72	73
2	67	68	70	70	70	71	72	71	74	73
3	68	68	71	71	73	71	76	74	77	76
4	70	71	73	73	75	74	78	74	79	76
5	72	71	76	74	78	76	78	77	80	79
6	73	74	76	76	78	77	81	79	83	81
7	74	76	77	78	79	79	81	79	83	82
8	77	78	80	78	82	81	82	82	84	84
9	77	78	80	81	82	83	85	84	87	86
10	79	80	83	83	85	85	85	86	89	88
11	81	82	85	85	87	85	87	88	89	90
12	83	85	86	87	89	87	91	90	93	92
13	87	87	88	89	90	90	92	92	94	92
14	88	89	91	89	94	92	96	93	98	95
15	92	90	95	92	95	93	97	93	99	95
16	93	91	96	93	98	93	101	96	103	98
17	97	91	98	93	100	93	102	96	104	98

Useful Online Resources:

- <http://www.toxicshock.com/healthprofessionalsinfo/>
- <http://emedicine.medscape.com/article/969239-overview>
- <http://www.uptodate.com/contents/treatment-of-streptococcal-toxic-shock-syndrome>

What is toxic shock syndrome?

- Toxic shock syndrome (TSS) is a severe acute superantigen-mediated condition, caused by toxin-producing strains of *Staphylococcus aureus* and *Streptococcus pyogenes*.
- The toxins act as superantigens, bypassing the antigen presentation pathway, resulting in massive T cell activation and an uncontrolled release of proinflammatory mediators. The action of these on the vascular endothelium leads to capillary leak and 'shock syndrome', which manifests as hypotension, fever, rash, and organ dysfunction.
- Typically, with staphylococcus, TSS is linked with a skin wounds and burns as this damages normal skin defences allowing bacteria to grow and synthesise toxins. In addition foreign bodies like vaginal tampons – known as "menstrual TSS" and nose packs can lead to TSS by this process.
- In streptococcal infections, TSS is usually linked with an invasive infection e.g. empyema, septic arthritis, necrotising fasciitis.