

Audit Tool

Table 1 provides the essential criteria for a quick hospital operational audit in the management of acute meningitis and meningococcal sepsis. Table 2 gives a more extensive audit tool for those who wish to perform a more thorough and detailed review of case notes.

Table 1 Short essential operational audit tool for patients with suspected meningitis and meningococcal sepsis.

Section A: Baseline information			Results
Centre Name			
Study number			
Age (years)			
Gender			M/F
Final diagnosis	Bacterial meningitis	<i>Streptococcus pneumoniae</i>	Y/N
		<i>Neisseria meningitidis</i>	Y/N
		<i>Listeria monocytogenes</i>	Y/N
		<i>Haemophilus influenzae</i> type B	Y/N
		Other (e.g. tuberculosis)	Y/N
		Specify which: _____	
	Viral meningitis	Herpes Simplex Virus type 2	Y/N
		Varicella Zoster Virus	Y/N
		Enterovirus	Y/N
		Other (specify) _____	Y/N
	Meningitis – unknown cause	Likely viral	Y/N
		Likely bacterial	Y/N
	Meningitis – other (specify)		Y/N

	Meningococcal sepsis	Y/N
Section B audit criteria		
1	Is the time of arrival at hospital recorded	Y/N
	a) If yes what was the time (and date):	DD/MM/YYYY HH:MM
2	Were blood cultures taken?	Y/N
	If yes:	DD/MM/YYYY
	a. What date and time were the blood cultures taken?	HH:MM
	b. Were blood cultures taken within 1 hour of arrival?	Y/N
3	Was blood (EDTA) taken for PCR?	Y/N
	Meningococcal	Y/N
	Pneumococcal	Y/N
4	Was an LP performed?	Y/N
	If yes:	
	a. What date and time was the LP was performed?	DD/MM/YYYY HH:MM
	b. Was the LP performed within 1 hour of arrival?	Y/N
	c. If 3b is yes - Was the LP performed before antibiotics were administered in hospital?	Y/N
	d. If 3b is no – were antibiotics given within 1 hour of arrival to hospital?	Y/N
5	A) Was neuroimaging performed before LP?	Y/N
	i) If yes what was the indication (tick all that apply)?	
	Focal neurological signs	<input type="checkbox"/>
	Presence of papilloedema	<input type="checkbox"/>
	Continuous or uncontrolled seizures	<input type="checkbox"/>
	GCS ≤ 12	<input type="checkbox"/>

	Other (please specify) _____	<input type="checkbox"/>	
	No reason documented	<input type="checkbox"/>	
	ii) If imaging was performed, was the LP done afterwards?		Y/N
	iii) If no to ai), were any of the following present:		
	An alternative diagnosis found		
	Imaging revealed significant brain shift		
	Other (please specify) _____		
	B) Were there any other clinical contraindications to immediate LP?		Y/N
	If yes, which contraindications were present?		Y/N
	i) Respiratory distress		Y/N
	ii) Infection at LP site		Y/N
	iii) Coagulation disorder		Y/N
	iv) Systemic shock		Y/N
	v) Rapidly evolving rash		Y/N
	vi) Protracted seizures		Y/N
	vii) Rapidly deteriorating GCS		Y/N
	viii) Other (please specify) _____		Y/N
6	Was opening pressure recorded when the LP was performed?		Y/N
7	Were the following tests sent?	CSF Glucose	Y/N
		Paired serum glucose	Y/N
8	a. Was bacterial meningitis suspected?		Y/N
	i) If yes, was CSF sent for pneumococcal PCR?		Y/N
	ii) If yes, was CSF sent for meningococcal PCR?		Y/N
	b. Was viral meningitis suspected?		Y/N

	i) If yes, was CSF sent for enteroviral PCR?	Y/N
	ii) If yes, was CSF sent for HSV - 2 PCR?	Y/N
	iii) If yes, was CSF sent for VZV PCR?	Y/N
9	a. What date and time were antibiotics for meningitis/meningococcal sepsis started?	DD/MM/YYYY HH:MM
	b. Were antibiotics started within 1 hour of arrival in hospital?	Y/N
	c. Was the empirical choice of antibiotic in line with the recommendations?	Y/N
	d. Was the definitive choice of antibiotic in line with the recommendations?	Y/N
	e. Was the antibiotic duration in line with the recommendations?	Y/N
10	Was the patient made aware of voluntary sector support?	Y/N

Table 2. Extended National meningitis and meningococcal sepsis audit tool

National meningitis and meningococcal sepsis audit tool			Results
Section A: Baseline information			
Centre			
Study number			
Age (years)			
Gender			M/F
Final diagnosis	Bacterial meningitis	Pneumococcal	Y/N
		Meningococcal	Y/N
		<i>Listeria</i>	Y/N
		<i>Haemophilus influenzae</i> type B	Y/N
		Other (e.g. tuberculosis)	Y/N
		Please specify: _____	
	Viral meningitis	HSV2	Y/N
		VZV	Y/N
		Enterovirus	Y/N
		Other (specify) _____	Y/N
	Meningitis – unknown cause	Likely viral	Y/N
		Likely bacterial	Y/N
	Meningitis – other (please specify)	_____	Y/N
	Meningococcal sepsis		Y/N
Section B audit criteria			
1	Is the time of arrival at hospital recorded		Y/N

	a. If yes what was the time (and date):	DD/MM/YYYY HH:MM
2	What was the patient's GCS?	
	a. If it was <12 was senior and/or intensive care input sought?	Y/N/NA
3	Were blood cultures taken?	Y/N
	If yes a. What date and time were they taken	DD/MM/YYYY HH:MM
	b. Were blood cultures taken within 1 hour of arrival?	Y/N
	c. Were blood cultures taken before the administration of antibiotics in hospital?	Y/N
4	Was blood (EDTA) taken for PCR? Meningococcal Pneumococcal	Y/N Y/N Y/N
5	Was blood taken for serology for storage?	Y/N
6	Was an LP performed?	Y/N
	a) If yes, what date and time was the LP performed at?	DD/MM/YYYY HH:MM
	b) Was the LP performed within 1 hour of arrival in hospital?	Y/N
	If 7 b is yes: Was the LP performed before antibiotics were administered in the hospital? If 7b is no – were antibiotics given 1 hour of arrival? What was the date and time the antibiotics (for suspected meningitis or meningococcal sepsis) were given?	Y/N Y/N DD/MM/YYYY HH:MM
7	A) Was neuroimaging performed before LP?	Y/N
	i) If yes what was the indication (tick all that apply)? Focal neurological signs Presence of papilloedema Continuous or uncontrolled seizures	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

	GCS ≤ 12	<input type="checkbox"/>	
	Other (please specify) _____	<input type="checkbox"/>	
	No reason documented	<input type="checkbox"/>	
	ii) If imaging was performed, was the LP done afterwards?		Y/N
	iii) If no to ai), were any of the following present:		
	An alternative diagnosis found		
	Imaging revealed significant brain shift		
	Other (please specify) _____		
	B) Were there any other clinical contraindications to immediate LP?		Y/N
	If yes, which contraindications were present?		Y/N
	i) Respiratory distress		Y/N
	ii) Infection at LP site		Y/N
	iii) Coagulation disorder (please specify further below)		Y/N
	INR >1.5		
	Platelets <50		
	Prophylactic LMWH within preceding 12 hrs		
	Therapeutic LMWH within preceding 24 hrs		
	Other (specify) _____		
	iv) Systemic shock		Y/N
	v) Rapidly evolving rash		Y/N
	vi) Protracted seizures		Y/N
	vii) Rapidly deteriorating GCS		Y/N
	viii) Other (please specify) _____		Y/N
8	Was opening pressure recorded when the LP was performed?		Y/N
9	Were the following CSF tests sent?	Protein	Y/N

		Total WCC	Y/N
		Differential WCC	Y/N
		Gram stain	Y/N
		Bacterial culture	Y/N
		Glucose	Y/N
		With a paired blood glucose	Y/N
10	Was bacterial meningitis suspected?		Y/N/NA
	a. If yes, was CSF sent for pneumococcal PCR?		Y/N
	Was CSF sent for meningococcal PCR?		Y/N
11	Was meningococcal sepsis or meningitis proven or a possibility?		Y/N/NA
	If Yes, a. was a posterior pharyngeal wall swab obtained?		Y/N
12	Was viral meningitis suspected		Y/N/NA
	If yes	HSV 1	Y/N
	a. Was CSF sent for?	HSV 2	Y/N
		VZV	Y/N
		Enterovirus	Y/N
		Other (please specify)	_____
	b. Were stool and/ or throat swabs taken for viral PCR		Y/N
14	Was CSF sent for any other tests?	Microscopy for Acid Fast Bacilli	Y/N
		Culture for TB	Y/N
		Other (specify)	Y/N

15	Was an HIV test performed?	Y/N
	If no, a. Was the patient known HIV positive? b. Was a test offered and refused? c. Had there been a previous recent test? d. There was no documentation regarding HIV testing	Y/N Y/N Y/N Y/N
	e. If the test was performed was it positive?	Y/N
16	Was advice sought from an infection specialist (microbiologist or infectious diseases physician)?	Y/N
17 and 18 are optional dependent on local practice and whether tests are available		
17	Was a serum procalcitonin performed?	Y/N
18	Was a CSF lactate performed?	Y/N
19	What date and time were antibiotics started?	DD/MM/YYYYH H:MM UNK
	a. Was the antibiotic started within 1 hour from arrival in hospital	Y/N
	b. What empirical antibiotic was given?	
	c. Was the antibiotic consistent with recommendations?	Y/N
20	Was meningococcal sepsis or meningococcal meningitis proven or likely?	Y/N
	If yes: a. were antibiotics stopped after 5 days?	Y/N
	If no was there a clinical indication to continue for longer?, b. how long were the antibiotics given for?	Y/N _____ days
	c. If Ceftriaxone was NOT used for treatment was a single dose of ciprofloxacin 500mg given?	Y/N
21	Was pneumococcal meningitis proven?	Y/N
	If yes a. was it a penicillin sensitive organism?	Y/N

	b. were antibiotics given for 10 days?	Y/N
	If no was there a clinical indication to continue for longer?, c. how long were the antibiotics given for?	Y/N _____ days
	d. If organism was penicillin resistant were antibiotics given for 14 days?	Y/N
22	Was <i>Listeria monocytogenes</i> identified as the cause of meningitis?	Y/N
	If yes, a. was the appropriate therapy continued for at least 21 days?	Y/N
23	Was <i>Haemophilus influenzae</i> type B identified as the cause of meningitis?	Y/N
	If yes a. was appropriate therapy continued for 10 days?	Y/N
24	Was 10mg dexamethasone administered?	Y/N
	If yes: a. What date and time was the dexamethasone given?	DD/MM/YYYY HH:MM
	b. Was it given:	Shortly before or simultaneously with antibiotics
		Up to 12 hours after antibiotics administered
		>12 hours after
	c. Was pneumococcal meningitis proven or thought likely?	Y/N
	If yes, d. was dexamethasone continued for 4 days?	Y/N
	If no, e. was dexamethasone stopped?	Y/N
25	Was the patient notified to the appropriate public health authority?	Y/N
26	Was follow up arranged?	Y/N
27	Did the patient or family state that their hearing was impaired?	Y/N
	If yes,	

	a. was a hearing test performed before discharge or within 4 weeks of discharge?	Y/N
28	Was a convalescent serology sample taken 4-6 weeks after admission?	Y/N
29	Was the patient made aware of voluntary sector support?	Y/N