Sepsis in Pregnancy

Cases

- 1. Day 3-4 postpartum
- 2. 18w
- 3. 16w

Case 1

- G1P1, NVD at term, uncomplicated.
- Day 3 co shivers, MW did temp, 39. Blood cultures taken, Panadol given, temp settled to 38.
- S/B Dr A – now completely well. Also conferred with Dr B. Decided to await tests and review.
- Later that day preliminary blood cultures showed cocci ?skin contaminant

Case 1

- Early hours day 4 sudden onset severe abdominal pain and unwell.
- Afebrile, PR 120, BP 112/74, RR24, poor urine output.
- IV fluids, penicillin and metronidazole commenced and ICU requested
- Transferred to ICU – very stormy course with sepsis, anuria, coagulopathy. ICU doctor said 50:50 chance of dying.
- Needed inotropes, platelet transfusions (lowest plt 9), haemofiltration

Case 1

- Blood cultures, vaginal swab and MSU all showed Strep Pyogenes (GAS) sensitive to penicillin and vancomycin
- Slow improvement, discharge from ICU on D10, 3 weeks in hospital
- Made a full physical recovery, decided not to have more children

Case 2

- 37 y.o. G2P1, no past hx of note.
- 18+4 sudden onset of vomiting and diarrhea after restaurant lunch of chicken salad
- Attended another hospital – admission temp of 40, later settled to 38. Thought consistent with ‘severe gastro’, cultures taken but no antibiotics given. Fluids, antiemetics, analgesia with improvement of symptoms
- 2320 – Pvt Obstetrician informed of presentation. Only informed of ‘gastro’.
- Soon after PPROM so transfer to St Vincents Private arranged

Case 2

- On arrival at SVPHM temp 39 and septic workup done, other obs stable, said to be alert to TPP.
- Despite normal BP, overall rapid deterioration. Antibiotics ordered, ICU called and attended early.
- Problems = prem delivery and PPH (1L), renal failure, DIC, inability to ventilate. Managed by ICU staff, 2 obstetricians and 2 anaesthetists.

Case 2

- Soon after transfer to ICU arrested.
- Ongoing CPR and transfer back to OT for ECMO by cardiac surgeons and perfusionist. Infectious diseases physician involved and added further antibiotics
- Preliminary path = GAS
- Despite multiple attempts over 4 hrs unable to establish perfusion with ECMO
- Sadly died ~12 hours after admission.
- NB blood test at other hospital at 2000 – Hb 129, plt 170, urea 3.6, Cr 77, CRP 18

Case 3

- 33 y.o. G2P1, previous healthy term delivery
- 16+3 PPROM, on setting of being mildly unwell for a few days
- temp 38.3, stable, IV antibiotics commenced
- After discussion with appropriate hospital staff, patient and partner decision to interrupt pregnancy on maternal grounds for presumed sepsis and previable PPROM

Case 3

- Misoprostol IOL
- ICU/ID involved but not required at that stage
- Fetus delivered, placenta retained, parents spent time with baby prior to MROP in OT, EBL 400 ml
- Postop systolic BP 70, given aramine and transferred to ICU

Case 3

- Spent 24 hrs in ICU on metaraminol infusion
- Discharged to ward next day
- Vaginal swab Strep pneumoniae sensitive to penicillin and cefazolin (GBS neg)
- Made a good recovery, pregnant again

Definitions

- Sepsis – Infection that has jumped the firebreak
- Sepsis may be defined as infection plus systemic manifestations of infection
- Severe sepsis - sepsis plus sepsis-induced organ dysfunction or tissue hypoperfusion
- Septic shock - the persistence of hypoperfusion despite adequate fluid replacement therapy

Background

- Maternal mortality from sepsis in Aust
  - 2003-05 – 0.6 / 100000
  - 2008-12 – 0.8 / 100000 (11.4 % of maternal deaths in Aust)
- Group A beta haemolytic strep (GAS) infection is cause in 25 - 50%
- Other common bacteria – E. coli, GBS, K. pneumonia, S. aures, Strep pneumonia, Proteus mirabilus
- Viral causes – Influenza, Varicella zoster, HSV, CMV

Risk Factors

- Obesity
- Impaired glucose tolerance / diabetes
- Impaired immunity/ immunosuppressant medication
- Anaemia
- Vaginal discharge
- History of pelvic infection
- History of group B streptococcal infection
- Amniocentesis and other invasive procedures
- Cervical cerclage
- Prolonged spontaneous rupture of membranes
- GAS infection in close contacts / family members
- Of black or other minority ethnic group origin

Considerations in Pregnancy

- Normal physiological changes of pregnancy may mask early signs of sepsis
- Fetus (of appropriate gestation) can act as an 'organ perfusion monitor'. Maternal sepsis with or without haemodynamic instability can present with fetal distress
- Management needs to consider the altered immunological response of the woman and altered physiological responses during preg – can make 'firebreak' less effective
- Consideration of effect of condition and effect of treatment on fetus

GOLDEN HOUR

- Shoot (antibiotics) first, ask later
  - Call the CFA to contain the fire
- Treatment should be commenced as soon as practical – ideally within the first hour – ‘golden hour’
- Maternal mortality can increase by 8% for each hour’s delay in administering antibiotics

Tools to detect sepsis early

- SOFA – Sequential (sepsis-related) Organ Failure Assessment score
  - Shown to be useful in identifying those patients with a suspected infection who are likely to have a prolonged ICU stay or die
- qSOFA – quick SOFA score can be used to identify patients promptly at beside with clinical information only
- omSOFA – obstetrically modified – pregnancy affects systolic BP so level is set lower

qomSOFA

	Score	Score
PARAMETER	0	1
Systolic BP	>/= 90mmHg	< 90mmHg
Resp Rate	< 25 breaths/min	25 breaths/min or greater
Altered mentation	Alert	Not Alert
	Sepsis suspected if score is 2 or 3	

qomSOFA

- In GP setting a score of 2 or more then warrants efficient referral to hospital emergency or obstetrician/private hospital

- Other signs of sepsis – pyrexia, hypothermia, tachycardia, hypoxia and oliguria

Other signs suggestive of Sepsis

- Disease progression may be much more rapid than in the non-pregnant state
- Genital tract sepsis may present with constant severe abdominal pain and tenderness unrelieved by usual analgesia
- Severe infection may be associated with preterm labour
- Toxic shock syndrome caused by staphylococcal or streptococcal exotoxins can produce confusing symptoms including nausea, vomiting and diarrhoea
- a watery vaginal discharge – offensive suggests anaerobes, serosanguinous suggests strep
- generalised rash

Initial management

- Maintain airway / oxygenate
- IV access, Blood tests and fluid administration
- Bloods – FBE, U+E, CRP, LFTs, Coags and lactate
- ABG if respiration or oxygenation abnormal
- Blood cultures x 2 sets (but this must not delay antibiotics)
- Other cultures as required – MSU, vaginal swab, nasopharyngeal swabs
- IV crystolloid – aim SBP > 90mmHg

Antibiotic Management

- Ideally administer within 1 hour of suspected sepsis
- Community acquired
  - Amoxicillin/ampicillin 2 gm IV 6/24
  - Plus gentamicin 4-7 mg/kg (1st dose)
  - Plus metronidazole 500mg 12/24
- Hospital acquired
  - Piperacillin 4gm + tazobactam 0.5 mg 8/24 and consider gentamicin
- At risk MRSA add vancomycin25-30 mg/kg
- At risk GAS add clindamycin 600mg IV 8/24

omSOFA
Organ dysfunction score >/= 2

System Parameter	0	1	2
Resp PaO2/FIO2	>400	300 to < 400	< 300
Coag – Plt	➢ 150	100-150	< 100
Liver - Bilirubin	<20	20-32	> 32
CVS – MAP	MAP > 70	MAP < 70	Vasopressors required
CNS	Alert	Rousable by voice	Rousable by pain
Renal – Cr	< 90	90-120	> 120

GAS contacts

- Consideration of prophylactic antibiotics for
  - Baby
  - Household contacts
  - Healthcare workers

THE APP

SVPHM AMS APP

The App


MATERNAL SEPSIS ASSESSMENT & MANAGEMENT GUIDE

RECOGNISE SEPSIS

- Altered mental status
- Tachycardia greater than 90 bpm
- Oliguria

Consider ICU/RAPID RESPONSE CALL

Maintain airway
Oxygenate

Consider supplemental oxygen

IV access
Bloods
Fluid administration

- URGENT bloods: FBC, EUC, CRP, LFTs, COAGS & Lactate, ABGs if RR & oxygenation are abnormal

Monitor for overload.

Administer ANTIBIOTICS within 60 minutes

ADMINISTER ANTIBIOTICS until other causes are verified.

Assess FETUS

- Fetal assessment may be USS & /or CTG depending on gestation.

Reassess WOMAN

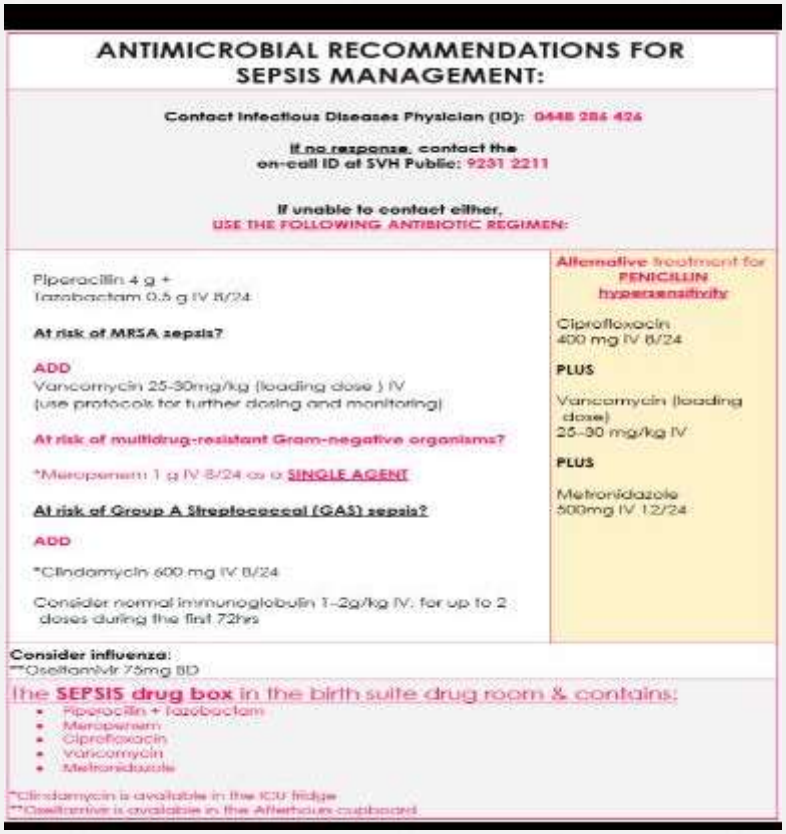
Signs of sepsis deterioration:

YES > ICU/RAPID RESPONSE

NO

- Rationalise antibiotics if source & microorganism are isolated.
- Consider treatment & sepsis impact on breastfeeding.

The App



ANTIMICROBIAL RECOMMENDATIONS FOR SEPSIS MANAGEMENT:

Contact Infectious Diseases Physician (ID): 0448 284 424

If no response, contact the on-call ID at SVH Public: 9231 2211

If unable to contact either, USE THE FOLLOWING ANTIBIOTIC REGIMEN:

Piperacillin 4 g + Tazobactam 0.5 g IV 8/24

At risk of MRSA sepsis?

ADD
Vancomycin 25-30mg/kg (loading dose) IV
(use protocols for further dosing and monitoring)

At risk of multidrug-resistant Gram-negative organisms?

*Meropenem 1 g IV 8/24 as a **SINGLE AGENT**

At risk of Group A Streptococcal (GAS) sepsis?

ADD

*Clindamycin 600 mg IV 8/24

Consider normal immunoglobulin 1-2g/kg IV, for up to 2 doses during the first 72hrs

Alternative treatment for PENICILLIN hypersensitivity

Ciprofloxacin
400 mg IV 8/24

PLUS

Vancomycin (loading dose)
25-30 mg/kg IV

PLUS

Metronidazole
500mg IV 12/24

Consider influenza:
**Oseltamivir 75mg BD

The **SEPSIS drug box** in the birth suite drug room & contains:

- Piperacillin + tazobactam
- Meropenem
- Ciprofloxacin
- Vancomycin
- Metronidazole

*Clindamycin is available in the ICU fridge
**Oseltamivir is available in the Afterhours cupboard

Take Home Message

- Case 1 – near miss, easy in retrospect to see needed antibiotics
- Case 2 – rapid deterioration
- Case 3 – recognition of potential sepsis and appropriate timing of antibiotics
- Infection common presentation in pregnancy, consider them higher risk
- If suspect significant infection or sepsis better to investigate, treat with antibiotics then reassess