

COMMUNITY ACQUIRED PNEUMONIA

RECOGNITION AND ASSESSMENT

Treat as pneumonia if patient has symptoms and signs below plus new unexplained chest X-ray shadowing, and the illness is the primary clinical problem

Symptoms

- Malaise, fever, rigors
- Vomiting, diarrhoea
- Confusion (especially in the elderly)
- Dyspnoea, cough
- Sputum (may be blood-stained, viscid and difficult to expectorate)
- Pleuritic pain

Signs

- High fever (often absent in the elderly)
- Tachycardia
- Tachypnoea
- Localized crackles
- Bronchial breathing (in about one third of hospital admissions)
- Chest signs may be absent or masked by other respiratory signs (e.g. COPD, CCF)

Enquire about pet birds (psittacosis, chlamydial infection) and recent hotel residence away from home or use of recreational water facilities (legionellosis)

Investigations

- Chest X-ray
- Oximetry

If SpO₂ <94% or features of severe pneumonia (see overleaf), measure arterial blood gases

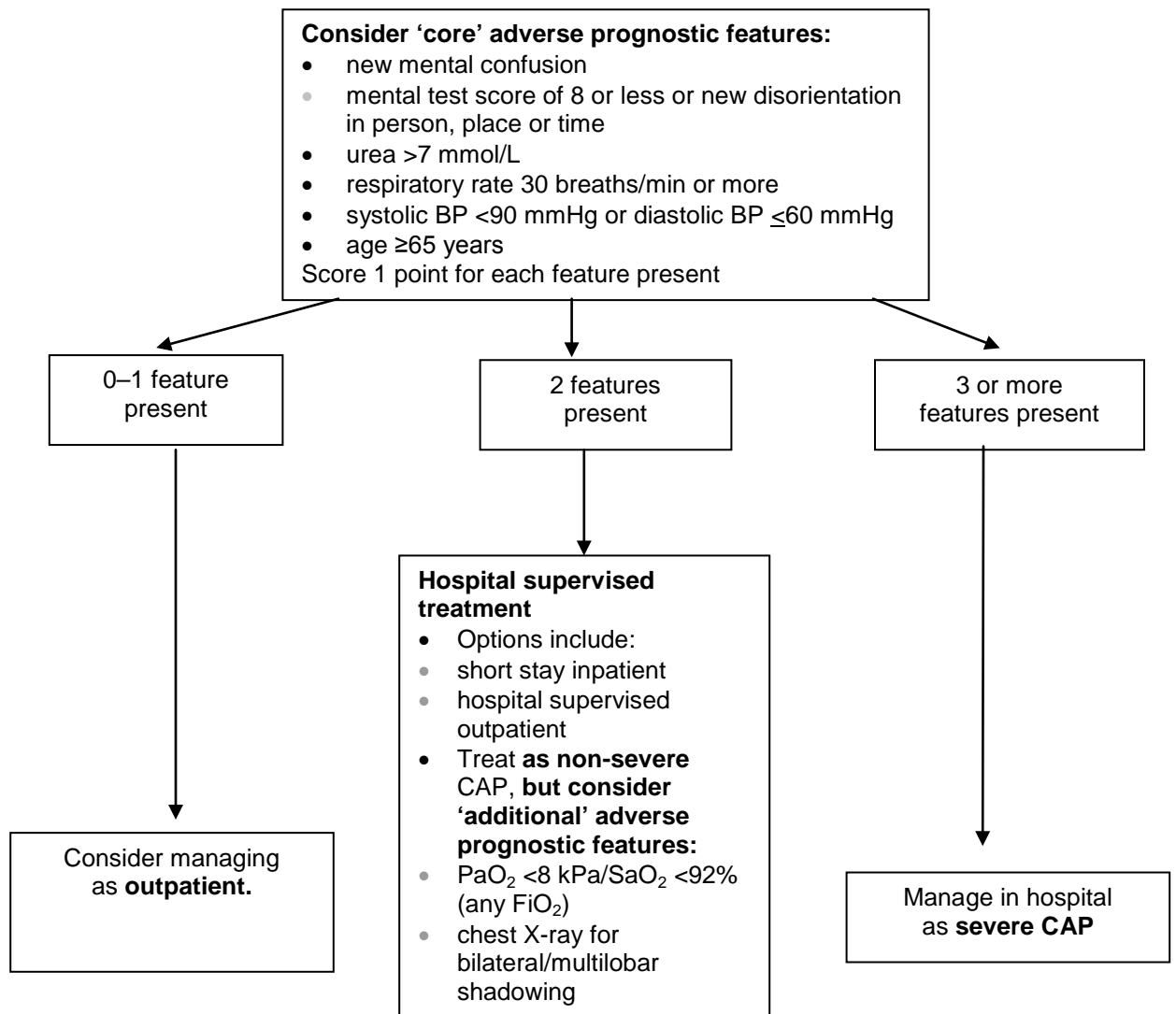
- FBC, biochemical screen, CRP
- Microbiology:
 - sputum – inspection, microscopy, culture and sensitivity
 - blood cultures – see **Collection of blood culture specimens** guideline (http://intranet/pdf/policies/IP_16_Policy.pdf)
 - in the seriously ill, serology for atypical organisms (influenza A and B, *Coxiella burnetii*, *Chlamydia psittaci*, *Mycoplasma pneumoniae*, *Legionella pneumophila*). Date of onset must be clearly indicated on request form
 - in the moderate and seriously ill (see diagram) send urine for Pneumococcal and legionella antigen, **OR** in patients with travel history/hotel stay during two weeks before admission, send urine for legionella antigen.

Differential diagnosis

- Pulmonary thromboembolism
- Lung cancer
- Left ventricular failure

Severity

- Management is based on assessment of severity. The following diagram (based on CURB 65 scoring system) is an aid to clinical judgement



IMMEDIATE TREATMENT

Supportive

- O₂ to maintain arterial SpO₂ of 94-98% unless comorbidity puts at risk of Type II Respiratory failure when target should be 88-92% – see **Oxygen therapy in acute adult wards** guideline
- Ensure adequate fluid replacement to compensate for effects of pyrexia and tachypnoea coupled with inadequate intake – See **Fluid replacement** guideline
- Adequate analgesia for pleuritic pain.
 - if well hydrated, indometacin 25-50 mg orally 8 hrly
 - in dehydrated patient, to prevent renal damage, prefer morphine sulphate 10 mg orally 4 hrly until adequate fluid replacement achieved
- Treat any accompanying airflow obstruction or cardiac failure
- Physiotherapy **only** in patients with copious secretions
- Admit to a respiratory ward – 19, 20.

Antibiotic therapy

- Start as soon as diagnosis made**; therapy should **always** cover *Streptococcus pneumoniae*

BTS Guidelines recommend initiating antibiotics within 4hrs of presentation to hospital.

- Please check for any previous recent microbiology results
- Route of administration depends whether patient able to swallow and absorb oral drugs, severity of illness and likely pathogens

Severity of illness	First line	Alternative (penicillin allergy)
Assume penicillin allergy only if convincing history of either rash within 72 hr of dose or anaphylactic reaction. If any doubt about whether patient truly allergic to penicillin, seek advice from a microbiologist.(8259, 8253, 8252, 8250)		
Patient discharged home or admitted for other reasons(CURB65, 0-1)	Amoxicillin 500 mg tds po or benzyl penicillin 1.2g qds iv for 5 days; if atypical infection suspected also give clarithromycin 500 mg bd po or iv for 5 days	Clarithromycin 500 mg bd po or iv for 5 days If no NG/PEG tube and unable to swallow or absorb oral drugs, clarithromycin 500 mg IV by infusion into larger proximal vein 12 hrly converting to oral as soon as oral route available. If not responding within 24-48 hrs, treat as severe pneumonia
Pneumonia of unknown aetiology requiring hospital treatment, not severe (CURB65, 0-2)	As above	Clarithromycin 500 mg bd po for 5 days If not responding within 24-48 hrs, treat as severe pneumonia
Pneumonia of unknown aetiology Requiring hospital treatment, severe. (CURB65 > 2)	Co-amoxiclav 1.2 g tds iv for 5 days PLUS clarithromycin 500 mg bd iv for 5 days by infusion into larger proximal vein If <i>Legionella pneumonia</i> strongly suspected discuss with microbiologist. Specific therapy for severe legionnaire's disease includes clarithromycin plus rifampicin 600 mg bd po/iv (use oral if possible as it is well absorbed)	Ertapenem 1g od iv for 5 days PLUS Clarithromycin 500mg bd iv for 5 days (If history of true anaphylaxis please contact microbiology)
Pneumococcal pneumonia	Amoxicillin 500 mg tds po. If no NG/PEG tube and unable to swallow or absorb oral drugs, benzylpenicillin 1.2 g qds iv	If the <i>Streptococcus pneumoniae</i> isolate is sensitive, clarithromycin 500 mg bd po. If no NG/PEG tube and unable to swallow or absorb oral drugs, clarithromycin 500 mg IV by infusion into larger proximal vein 12 hrly converting to oral as soon as oral route available. If not sensitive to

		clarithromycin, discuss with microbiologist.
<i>Legionella pneumonia</i>	Clarithromycin 500 mg bd po or iv by infusion into larger proximal vein, depending on severity; in severe cases, add rifampicin 600 mg bd po or iv infusion (use oral if possible as well absorbed). If infection with <i>Legionella pneumoniarum</i> confirmed or strongly suspected please continue therapy for 14 days.	
<i>Mycoplasma pneumonia</i> or <i>Chlamydia pneumonia</i>	Clarithromycin 500 mg bd po or iv by infusion into larger proximal vein, for 10 – 14 days	
<i>Confirmed Q fever (Coxiella burnetii), psittacosis (Chlamydia psittaci)</i>	Doxycycline 100 mg bd po for 10 – 21 days. For alternative antibiotics, seek advice from a consultant microbiologist (8259, 8253, 8252, 8250)	
<i>Aspiration pneumonia</i>	Moderate: Co-amoxiclav 625 mg po or 1.2g tds iv for 5 days Severe: Piperacillin/tazobactam 4.5 g tds iv or meropenem 1g tds iv for 5 days	Moderate: Doxycycline 100 mg bd po PLUS metronidazole 500mg tds po for 5 days Severe: Meropenem 1g tds iv for 5 days. Contact microbiologist if patient has severe hypersensitivity to B-lactam antibiotics.
<i>Cavitating pneumonia</i>	Discuss with microbiologist,	

Assessment of requirement for intensive care

- Indications for transfer to ITU (5024, 5025) include:
- severe pneumonia on CURB 65 score
- arterial PaO₂ ≤8 kPa with inspired oxygen ≥60%
- severe acidosis – pH <7.25
- exhausted, drowsy or unconscious patient
- respiratory or cardiac arrest
- shock

MONITORING TREATMENT

- In severe pneumonia, clinical assessment, including mental state 12 hrly, until improving
- Pulse, BP, temperature, respiratory rate and SaO₂ with FiO₂ 4 hrly until stable
- aim for SaO₂ ≥92%
- if type 2 respiratory failure – see **Respiratory failure** guideline
- Biochemical screen – repeat every 24-48 hr while significant abnormalities persist
- If patient not improving after 72 hr despite adequate therapy, repeat chest X-ray and CRP
- if CRP not falling, consider possibility of empyema or abscess

SUBSEQUENT MANAGEMENT

- Nutritional support in prolonged illness

Duration of antibiotics

- If IV route used on admission, change to oral when fever subsides and clinical parameters stable, usually after 48 hours parenteral therapy. Use oral antibiotic to which the pathogen is sensitive, if cultures positive.
- In uncomplicated pneumonia, give five to seven days treatment
- In patients with severe pneumonia, staphylococcal pneumonia, or legionella pneumonia, continue antibiotics for at least two weeks

Failure to respond to therapy

- Request review by specialist in respiratory medicine/infectious disease and consider:
- Incorrect diagnosis (e.g. pulmonary embolism, pulmonary oedema, pulmonary eosinophilia, Wegener's granulomatosis)
- Resistant organism (e.g. amoxicillin-resistant/penicillin-resistant *S. pneumoniae*, mycoplasma, psittacosis, Q fever or staphylococcal pneumonia) – discuss with microbiologist (8250/2/3/9)
- Unrecognized pulmonary tuberculosis
- Unrecognized immunodeficiency (e.g. HIV infection leading to pneumocystis pneumonia)
- Complications:
 - parapneumonia effusion or empyema – aspirate, culture and drain, and refer to respiratory physician – see **Pleural infection and empyema** guideline
 - lung abscess – refer to respiratory physician
 - bronchial obstruction – refer to respiratory physician
- pulmonary embolism – see **Pulmonary embolism** guideline
- fever related to drug therapy – omit therapy for 48 hr

DISCHARGE POLICY

- Check within 24 hr of planned discharge that patient does not have more than one of the following:
 - temperature $>37.8^{\circ}\text{C}$
 - heart rate $>100/\text{min}$
 - respiratory rate $>24/\text{min}$
 - systolic blood pressure $<90\text{ mmHg}$
 - oxygen saturation $<90\%$
 - inability to maintain oral intake
 - abnormal mental status

FOLLOW UP

- Follow up in clinic with chest X-ray about 6 weeks after discharge for all patients who have persistent symptoms or physical signs or who are at higher risk of underlying malignancy (especially smokers and those $>50\text{ yrs}$) whether or not they have been admitted. Convalescent serology can be obtained at this visit