Information for staff on Pneumocystis Pneumonia (PcP)

Outbreak Prevention and Management

The purpose of this information is to provide an aide-memoire for clinical staff and Infection Prevention and Control Teams (IPCT), who may be involved in the outbreak prevention and management of PcP.

All staff should be familiar with National Infection Prevention and Control Manual Standard Infection Control Precautions (SICPs) and transmission based precautions (TBPs).

The following advice is supplementary and provides details of specific actions necessary to prevent and manage PcP outbreaks. It should be noted that there is currently no up-to-date National or European Guidance relating to the Prevention and Management of PcP in high risk patients.

Outbreak Prevention

What is PcP?

PcP is caused by the opportunistic fungus *Pneumocytis jirovecii* (formerly *P. carinii*) that affects the respiratory system. Typical presentation includes fever, cough and shortness of breath[1], which develops after a relatively long incubation period, ranging from approximately 3-12 weeks.[2;3] Transmission is considered to occur via the airborne route, although there is still a lack of consensus regarding the exact mechanism.[4]

Which patient groups are considered high risk for infection?

Severely immunocompromised patients including those with HIV (CD4+ counts < 200 cells/µl), haematological and solid malignancies receiving cytotoxic chemotherapies, solid organ transplant patients, those on high dose steroids and patients treated with immunosuppressive regimens for inflammatory conditions.[5;6] Since PcP is unlikely to affect immunocompetent hosts, consider excluding causes of underlying immunosuppression in those diagnosed with the infection.[6]

What Transmission Based Precautions should be applied?

Unlike the majority of microorganisms transmitted via the airborne route, *P. jirovecii* is considered to only pose an infection risk to immunosuppressed patients, therefore apply the following precautions to prevent ongoing transmission in this patient group:

What is the optimal patient placement for suspected or confirmed PcP patients?

- Isolate patients with PcP in a single ensuite room in high risk units/settings, e.g. ICU/PICU/NICU/oncology/haematology/renal until resolution of symptoms or discharge from hospital. [4,7]
- Avoid placing patients diagnosed with PcP in the same ward/healthcare area as immunocompromised patients.[8]

What category of Transmission Based Precautions should be applied by healthcare staff?

- Transmission risk to immunocompromised patients is via the droplet route due to symptoms associated with PcP (e.g. cough). Healthy staff are at no risk to PcP. Since there is currently no evidence of PcP healthcare staff acquisition from colonised patients [9-11] there is no rationale for the wearing of respiratory protection (RPE) by healthcare workers during PcP outbreaks.

What Respiratory Protection (RPE) should be worn by patients?

- In an outbreak, all immunocompromised patients should be encouraged to wear single use, fluid resistant masks during transport between wards/clinical areas, to reduce the likelihood of cross-transmission.[4,7]

How can PcP be prevented?

Use of prophylaxis is considered to be the most successful prevention strategy for PcP. Prophylaxis with co-trimoxazole (as a first line agent) of appropriate at-risk patient groups is recommended. Dapsone or pentamidine are typically prescribed as alternatives.[1;4-6] The duration of prophylaxis varies depending on the patient's condition and level of immunosupression.[1;6]

How should PcP be managed?

Successful management of infection is attributed to appropriate treatment of affected patients. As with prophylaxis, patients should be treated with co-trimoxazole as the first-line agent (a number of alternatives are also available).[4;6] Treatment duration is approximately 2-3 weeks.[5;6] In addition, it may be necessary to consider prophylaxis for all immunosuppressed contacts,[4] including patients who have been discharged, up to 12 weeks prior to recognition of the outbreak (as determined by the incubation period).

Outbreak Management

How is a potential PcP outbreak identified?

A single healthcare-associated case in a high risk patient will require investigation and should be considered as part of 'alert organism' infection prevention and control teams (IPCT) actions.[4,7] An outbreak may be suspected if the incidence of infection is higher than normally expected in a given healthcare area over a specified time period, and where two or more cases may have a potential link in time and place.[7]

Outbreaks caused by *P. jirovecii* are often recognised late. This is generally considered to be due to the long-incubation period associated with the infection, which is typically followed by a non-specific presentation and often initially mistaken for other infectious causes.[7]

In line with Chapter 3 of the National Infection Control Manual, following detection/recognition of an incident a member of IPCT or Health Protection Team (HPT) will undertake an outbreak assessment and investigation.[7]

Clinical Management of contacts

In the absence of National or European Guidance relating to the Prevention and Management of PcP in high risk patients, consider the following:

- Exposed contacts should be clinically assessed for risk;
- Offer prophylaxis outlined as above; or
- For at risk patients that maybe also have a higher risk of toxicity related to prophylactic treatment, implement close monitoring through screening of the contacts' respiratory samples and provide early treatment if positive patients are identified.[4]

Investigation of sources of transmission

During an outbreak it is prudent to consider a hypothesis that will inform an investigatory review of potential sources. Consider the following where ongoing transmission is identified:

- screening – to identify any asymptomatic carriers; and
- ventilation system-associated risk.[4]

Reference List

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