A multi speciality approach to an outbreak of Pneumocystis jirovecii: Interventions, investigations and further questions.

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Background

Pneumocystis jirovecii pneumonia (PJP) is a host specific, opportunistic, fungal organism which causes pneumonia in immunosuppressed patients and results in significant mortality. Infection occurs via the respiratory route and may be caused by patient to patient transmission or via the environment. The life cycle, reservoir and source of transmission is not yet clearly understood. We report our results from a single centre, from the 5th January 2012 to 31st March 2016. Highlighting the importance of a Trust wide multidisciplinary, collaborative working approach to ensure patient safety and the prompt application of Infection, Prevention and Control (IP&C) measures during a suspected outbreak of PJP.

Methods

A multi-disciplinary outbreak management group prioritising patient safety identified the required actions and IP&C measures. A separate clinical group reviewed all positive PJP Polymerase Chain Reaction (PJP-PCR) results. Cases were stratified into definite, probable, possible or colonised cases according to clinical, imaging and microbiological data. PJP-PCR cycle threshold times have proven very useful, however the technique is not yet fully validated. Retrospective Multilocus Sequence Typing (MLST) genotyping was undertaken on PJP-PCR positive samples to identify if an outbreak strain was in circulation, as clones of one genotype are characteristic of an outbreak strain. Policy and procedures for the IP&C of PJP were written along with guidelines for prophylaxis and clinical management. Prompt isolation under respiratory precautions for all confirmed or suspected cases was implemented. Individual clinical teams utilised PJP prophylaxis in their vulnerable patients. Trust wide talks were given to raise awareness of PJP. Location mapping of cases and a case-control study in renal patients was carried out. This looked at prolonged environmental exposure to the healthcare setting, direct contact with another patient with PJP and spatial overlap within a limited timeframe which raises the possibility of an environmental reservoir. An investigation into the possibility of an environmental reservoir was carried out using different types of environmental sampling. This included Air Handling Unit (AHU), inlet (course and fine) and outlet filter sampling and genotyping, surface swabbing and air sampling.

Results

Overall 89 PJP-PCR specimens have been reported in our centre from 05/01/12 to 31/03/2016. The genotype (811/81) was identified in 12 patients. The 2014 peak identified 27 cases; 14 definite, 4 possible and 9 colonised. 16 of these cases were within renal and predominantly affecting renal transplant patients. Early location mapping indicated some overlap in cases but no conclusive evidence of person to person transmission, therefore the group concentrated on the possibility of an environmental reservoir or contamination. A recent case-control study in renal patients has demonstrated a temporospatial relationship in cases but not in the controls.

Conclusion

Although, the outbreak has now de-escalated the Infection Prevention and Control team continue to monitor closely with surveillance. This will enable us to determine early fluctuations in our rates, alert the clinical teams of the risk group and act swiftly. It is too early to conclude if the outbreak is controlled. Further work is required to investigate and understand the significance of environmental PJP-PCR and its roles in the transmission and pathogenesis.