» RURAL PHARMACY

A cryptic case from a rural hospital

RPSN Rural Pharmacy Support Network

BY LAURA BOYCE

Working in a rural community presents some challenges. However, it is also a rewarding experience with many opportunities to contribute to quality use of medicines.

Hospital pharmacists practicing in rural areas are an important part of the healthcare team. They are able to provide advice on the choice, dose and administration of pharmacotherapy, source medications, provide guidance on managing adverse effects, review regimens for potential interactions and provide patient education. This cryptic case follows the journey of Paul, a local cabinetmaker, and his management in a rural community.

Paul

Paul presented to his local emergency department (ED) in rural New South Wales. His symptoms included fever, wheezing, coughing and rigors. He also had a three-month history of approximately 10 kg weight loss and recurrent, severe headaches, but previous to this, had been healthy. Paul was a non-smoker.

A chest X-ray was performed and revealed opacity in the left, lower lobe. Therefore ED staff made a provisional diagnosis of community acquired pneumonia (CAP), with further investigation of other symptoms on admission. Paul was initially treated for moderate CAP with benzylpenicillin intravenously (IV) and doxycycline.[1]

Paul was not responding to the antibiotics so the medical team ordered a lung biopsy and magnetic resonance imaging (MRI). The MRI was delayed for several days as there was no machine in the rural town. Paul had to be taken to a hospital in a larger town to have this imaging performed. It revealed lesions throughout his brain, shifting the diagnosis towards lung cancer with cerebral metastases.

However, results from the lung biopsy enabled identification of encapsulated yeasts by microscopic examination. There was no infectious disease (ID) physician in the town, prompting a phone consultation with a physician from the tertiary referral hospital (within the same local health district). A new provisional diagnosis of cryptococcal meningo-encephalitis with pulmonary lesions was made.

The ID team recommended that a lumbar puncture be performed to confirm the presence of disease with the cerebral spinal fluid (CSF). Paul also had his HIV status tested as cryptococcal infections may be associated with immunosuppression (results were negative). Initial review of CSF sample under India ink staining revealed cryptococci was present. It was later serotyped as *cryptococcus gattii*.

Cryptococcus gattii

In Australia, *cryptococcus gattii* is associated with eucalyptus trees;[2,3] therefore, it is thought that Paul's occupation and his place of residence may have placed him at risk of this type of infection. Inhalation is the principal portal of entry for infection and pulmonary infection is the most common presentation. From the lungs it then disseminates throughout the body via blood stream, usually to the brain.[2] *Cryptococcus gattii* also appears to have a propensity to infect immunocompetent hosts, unlike c. neoformans. It is thought that this may be due to its virulence factors. It has the ability to switch its capsular phenotype, it secretes a hydrolytic enzyme that causes tissues damage and aids dissemination. It also has a tolerance of low pH and elevated salt levels.[2]

In Paul's case, the ID team recommended liposomal amphotericin and flucytosine IV as induction treatment.[1] However, neither of these anti-fungals was on the hospital's formulary and were therefore not immediately available. This presented a supply challenge for the rural hospital pharmacy department. The initial supply of the liposomal amphotericin had to be couriered from the tertiary referral hospital and the flucytosine was ordered directly from the manufacturer.

Induction treatment is normally continued for a minimum of two weeks, with longer courses for patients with cryptococcomas.[1] Once the CSF was negative, Paul had 12 days of additional treatment on the advice of the ID physicians. During the induction phase it is important to monitor full blood count, electrolytes, renal and hepatic function.[4] In addition, current literature advises that flucytosine levels be monitored; however, this proved difficult as results were taking approximately one week to be provided to clinicians. Levels were performed once weekly during therapy and the results were reviewed retrospectively (all were within range).[1,4] Amphotericin may also cause electrolyte abnormalities therefore this was also monitored throughout his therapy.[1,4] Paul developed hypokalaemia during treatment and this was managed with potassium supplementation. He also experienced an infusion reaction consisting of a rash over his lower

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back. However, this resolved when the infusion was given over two hours instead of one.

Consolidation therapy

The ID team recommended consolidation therapy be initiated before ceasing the induction treatments (amphotericin and flucytosine). Fluconazole po 800 mg daily was initiated and there was a five-day overlap before the induction therapies were ceased.[1] At this point, Paul was discharged from hospital. If consolidation therapy is successful after eight weeks the dose of fluconazole can be reduced to 400 mg daily (for the eradication/suppression phase). Paul received four months of consolidation therapy and continued to be reviewed by the ID physician. The eradication/suppression treatment may be continued for 6–18 months in immunocompetent patients with cerebral involvement.[1] Paul received 18 months of therapy and the team was able to reduce the dose of fluconazole to 200mg daily. He was stable on this dose for eight months; however, at the end of 2013 a new lesion was noted on the MRI. Even though he was asymptomatic the dose of fluconazole has been increased to 400 mg daily and the plan is for this to continue for another 12 months.

In conclusion, this cryptic case demonstrates how rural and metropolitan practitioners can work together to ensure patients receive the best possible care.

Furthermore, it is one of many interesting cases pharmacists in rural areas are exposed to within their clinical practice.

References

1. Therapeutic Guidelines Antibiotic Expert Group, 2010. Therapeutic Guidelines: Antibiotic, version 14, Therapeutic Guidelines Pty., accessed via CIAP at: www.ciap.health.nsw.gov.au/ (accessed: 10/03/2014).
2. Dixit, A. et al., Cryptococcus gattii: An Emerging Cause of Fungal Disease in North America, Interdisciplinary Perspectives on Infectious Diseases, Review Article 2009;1-13 At: www.ncbi.nlm.nih.gov/pmc/articles/PMC2686104/pdf/IPID2009-840452.pdf (accessed: 10/03/2014).
3. The University of Adelaide, 2014, Mycology Online: Cryptococcus gattii At: www.mycology.adelaide.edu.au/Fungal_Descriptions/Yeasts/Cryptococcus/C_gattii.html
4. Rossi, S. (ed), Australian Medicines Handbook, 2014. AMH. Last modified by AMH: Jan 2014, accessed via CIAP at: www.ciap.health.nsw.gov.au/ (accessed: 10/03/2014).

More white coats in Qld

The University of Queensland's Pharmacy Australia Centre of Excellence (PACE) was flooded with white coats last month.

The School of Pharmacy hosted the annual Student Engagement Ceremony to welcome new students and present them with their white dispensing coat which is symbolic of the pharmacy profession.

Head of School Professor Nick Shaw said the purpose of the ceremony was to welcome first-year students not only to the school but to the profession as a whole.

'We see the ceremony as our opportunity to provide new students with a sense of the history, pride, public service and professionalism that is pharmacy and highlight the responsibility and crucial role that pharmacists play in the healthcare of the community,' he said.

'We hope and trust the ceremony gives students a sense of community, a sense of 'being' a professional, both as students and as health professionals in training. Professionalism can be pictured or imagined as something that, when it commences, requires a firm foundation but requires room to grow, to be nurtured and to develop.

'Professionalism can, unfortunately, be easily damaged but should form part of every health professional's daily life and be firmly established through individual careful reflection.'

Professor Shaw said the white dispensing coat was a symbol of professionalism and a commitment to the provision of healthcare.

First-year student Chloe Minns said the event helped the students feel engaged in their learning and development as pharmacy professionals.

'The ceremony helped us hit the ground running, right from the beginning of this four year course we aren't just reading books, we are learning how to behave and feel like pharmacists,' Chloe said.

'Having the coat, I think, gives us a sense of pride, that we are somewhere we are welcome and somewhere we belong.

'My favourite part was hearing from the guest speakers, and seeing so many esteemed guests actually there; having them in front of us, telling us about all the opportunities and the future ahead of us in the pharmacy profession, was inspiring.'