Derby Teaching Hospitals NHS
NHS Foundation Trust

The diagnosis and management of invasive fungal infection in haemato-oncology patients – reviewing departmental guidance.

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Background

- The diagnosis of invasive fungal infection (IFI) in haemato-oncology patients is challenging.
- We aimed to assess current practice and review departmental guidelines at the Royal Derby Hospital.
- We hereby describe the process of this review and the associated challenges of antifungal stewardship.

Methods

- A prior departmental audit of fungal biomarker screening results was reviewed, including sample turnaround times.
- A literature search was performed, and the resulting evidence discussed between our microbiology, pharmacy, haematology and respiratory departments to determine how this could be applied to our local patient demographic.
- Our departmental spending on- and usage of posaconazole prophylaxis was reviewed

Results

- Over a 1-year period, 22 samples were sent for galactomannan and β-D-Glucan testing to the local reference laboratory. None were positive, despite 11 patients being treated for IFI. It was postulated this could be due to posaconazole prophylaxis decreasing the sensitivity of the test.
- The median turnaround time was 4 days (range 2 -11 days), often depending on whether a sample was sent at or before the weekend.
- A small proportion of patients (27%) with abnormal findings on high-resolution CT proceeded to a broncho-alveolar lavage (BAL). BAL samples did not have fungal microscopy performed using an optical brightener as per national guidelines, and there was no laboratory process form to ensure all appropriate tests were performed.
- Posaconazole expenditure was far higher than predicted (by £120,000). The reasons for this were discussed and considered to be mostly due to longer duration than agreed in guideline.

Changes Made

- Changes incorporated into the guideline after consultation included biomarker testing in serum and BAL samples for breakthrough infections only[1,2]. A focus on performing a timely BAL was proposed with clarification on procedure requesting and a corresponding electronic order code was developed. The laboratory SOP was updated to include fungal staining, and a checklist developed for medical microbiology review of tests needed.
- Posaconazole usage was brought back in line with guidance and immediate savings made (average monthly spend decreased by £10,000).
- Isavuconazole was added to the formulary for use in selected complex patients.

An illustrative case highlighting typical IFI diagnostic challenges

- 29 year old lady with AML and post her 2nd cycle FLAG-IDA chemotherapy, underwent a HRCT chest due to an ongoing pyrexia despite 5 days of antibiotics.
- Changes consistent with fungal infection shown (figure 1).
- 7 days later patient underwent bronchoalveolar lavage. Galactomannan requested 5 days after BAL performed
- Galactomannan took further 9 days to get result as DETECTED back from reference laboratory (value 0.58)
- Total turnaround time (TAT) of 14 days after BAL taken
- Serum GM and BD Glucan not detected (TAT on this took 11 days)

Solutions implemented to improve total turnaround time (TAT)

1. *Improved communication between Haematology & Respiratory department to enable pathway to be developed for BAL requests*

✓ IT order code developed for automatic galactomannan testing on BAL samples from immunosuppressed patients

2. BAL testing form in laboratory to be checked by medical microbiologist

✓ Update of BAL processing SOP to include calcofluor microscopy

3 .Communication with reference laboratory

✓ Delayed run start time, Increased frequency of testing, IT support to enable faster communication of result

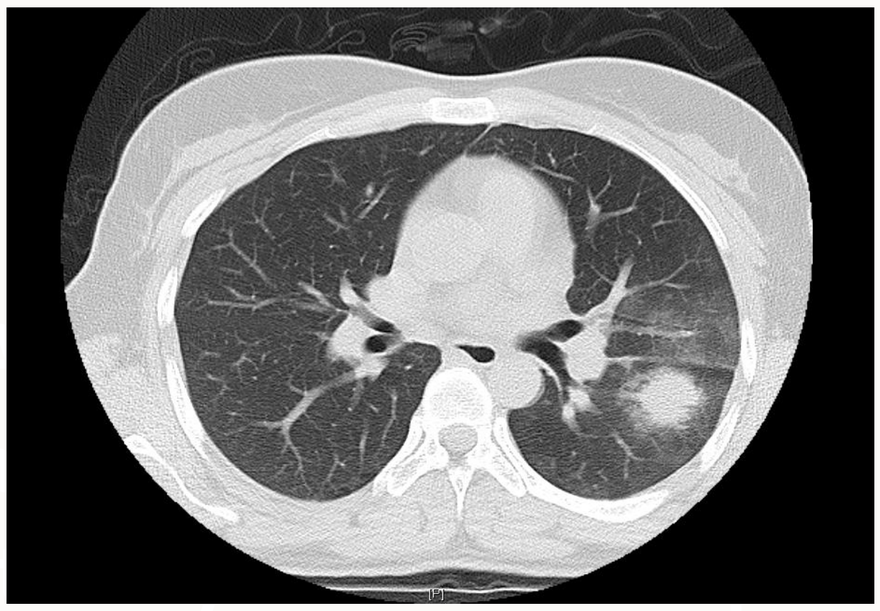

Figure 1 – axial CT slice showing area of consolidation with surrounding "halo"

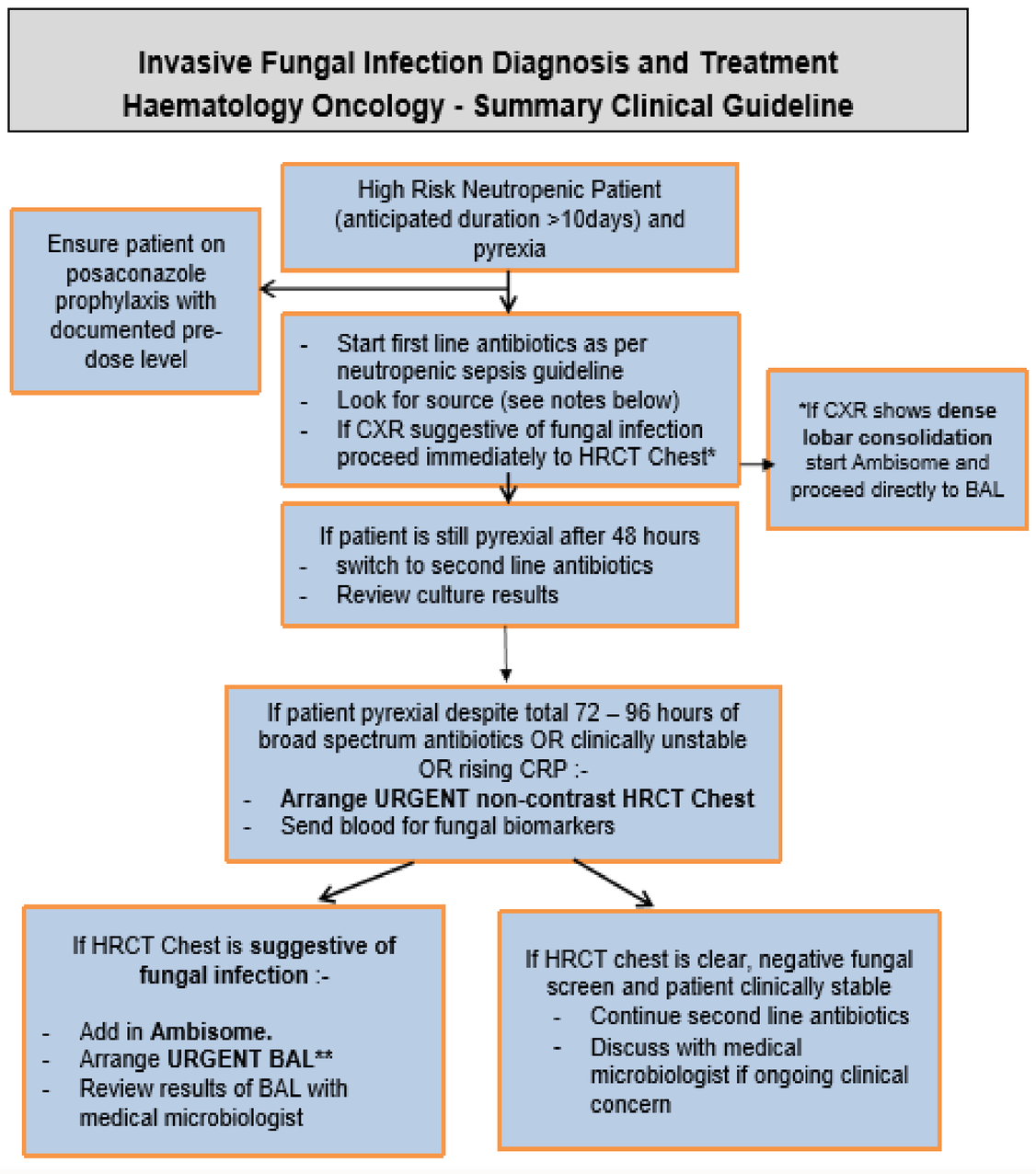

Figure 2 – our new trust guideline following audit, consultation and review

Conclusion

- As a result of this work we have developed a new pathway to improve inter-specialty working in the diagnosis of IFI, and have significantly reduced expenditure on antifungal prophylaxis.
- The importance of discussion of results between haematology and microbiology departments has been emphasised
- By ongoing monitoring and review of evidence we hope to ensure best practice is applied to the diagnosis and management of IFI in this patient population

References

1. IDSA Guidelines 2016 Practice Guidelines for Diagnosis and Management of Aspergillosis
2 British Society for Medical Mycology best practice recommendations for diagnosis of serious fungal diseases, Lancet Infectious Diseases Volume 15, No. 4, p461–474, April 2015