Timing of empirical Computerized tomography

Timing of empirical Computerized tomography imaging of chest in children with high risk febrile neutropenia- should delayed imaging be preferred?

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Disclosure

- Nothing to disclose

Introduction

- Infection (IFI) major roadblock for cure in paediatric leukaemia
- Chest - most common site of occult infection in febrile neutropenia episode (FNE)- 35% of treatment related mortality
- Recommendation-CT chest scan after 96 hours of persistent fever in high risk FNE
- Empirical CT chest imaging had 52% positivity rate- after first week of FNE
- Should the timing of imaging be delayed?

Dornbusch et al ESCMID guidelines for diagnosis of invasive fungal infections 2010
Lehrnbecher et al guidelines for management of febrile neutropenia 2017
David o Connor et al infection related mortality in UK ALL 2003

Is **routine computed tomographic scanning justified** in the **first week** of **persistent febrile neutropenia** in **children** with **malignancies**? Agrawal et al PBC 2011

Aims and objectives

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- To determine the ideal timing
  - Empirical CT imaging of chest in high risk FNE

Methodology

- Retrospective analysis- children with ALL with FNE Jan 2013- Dec 2014
- Empirical initiation of anti fungal treatment was practiced
- Children with CT imaging chest in study period enrolled
- Non-empirical CT imaging-
  - Presence of respiratory symptoms and signs
  - Positive X-ray finding
  - Positive serum galactomannan
- Empirical CT imaging- none of the above present

Results

- 194 children with ALL were treated
  - 42 children underwent CT imaging of chest (8 children imaged twice for different FNE)
    - 50 Chest imaging were performed-
      - 23 (46%) were empirical imaging
      - 27 (54%) were non-empirical
- Median day of FNE to perform CT chest imaging-
  - Empirical 8 (IQR 5.5-12) days
  - Non-empirical 5 (IQR 4.25-8) days
- Abnormality in CT chest imaging
  - 16/23 (70%) in empirical group
  - 20/27 (74.1%) in non-empirical group

Results- abnormal empirical imaging (n=16/23)

- Imaging findings-
  - Pulmonary nodules -11
  - Consolidation -2
  - Lung abscess-1
  - Cavity formation -1
  - Air crescent sign-1

Results- empirical imaging (n=23)

- Day of FNE at the time of empirical CT imaging
    - Abnormality in scan-10.5 (IQR 7.5-12.25) days
    - Normal scan-6 (IQR 5-10) days
- > 7 days of FNE at the time of empirical imaging
    - 11/15 (74%) had abnormality in imaging
- <8 days of FNE at the time of imaging
    - 5/8 (62.5%) had abnormality in imaging

Results- empirical imaging (n=23)

- Association between abnormality in empirical CT chest imaging and CT imaging after day 7 of FNE
  - P value =0.048
- Outcome of FNE
  - 17 surviving
  - 4 died secondary to septicaemia (2- klebsiella, 2- E.coli)
  - 2 relapsed

Conclusion

- In setting with empirical treatment escalation
- **Empirical CT imaging of chest can be performed after 7 days of FNE**
    - Reduce the rate of negative imaging and radiation exposure

- Limitations-
    - Retrospective analysis
    - Small sample size
    - Needs prospective evaluation