A Challenging Case of Crackles: Heart Failure after Pre B Acute Lymphoblastic Leukemia Treatment

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Background

- Greater than 15,000 cancers are diagnosed in patients younger than 19 years old resulting in approximately 450,000 survivors of pediatric cancer.[1]
- ALL (Acute Lymphoblastic leukemia) is the most common cancer diagnosed in children and represents 25% of cancer diagnoses younger than 15 years.[2]
  - Approximately 98% achieve remission
  - 85% of patients are expected to be long tern event free survivors with over 90% surviving at 5 years.[2]
- Cardiovascular disease is the leading cause of non-cancer morbidity in cancer survivors[3].
- Post- Heart transplant survival outcomes has been shown to be similar in children with & without pre-transplant malignancy[4].

Case Presentation

- The patient is a 4 year old male with a history of infant pre B, CNS negative ALL diagnosed at age 10 months on 6/9/15
  - Treatment Regimen: Chemotherapy AALL0631
  - Cumulative Anthracycline Dose: 145 mg/m^2
- Patient achieved remission with induction.
- One month after therapy completion on 7/27/17, he presented with orbital disease and CSF positive for extramedullary relapse of ALL
  - Treatment Regimen: AALL1331
  - Received 1800 cGy Cranial radiation therapy
  - Achieved remission with 4 weeks of retrieval maintenance chemotherapy until 7/5/19: vincristine, methotrexate, mercaptopurine, solumedrol

Clinical Course

- **Timeline of Cardiac Events**

1/30/19: Crackles, URI symptoms & fevers
- Rhino positive

2/15/19: Persistent crackles with cardiomegaly
- Initial ECHO showed Pericardial effusion,
- Moderately depressed biventricular function (fig 1)
- Lab work: Troponin leak of 2.06 ng/ml & CRP 23 mg/dl
- ECG with ST elevation and NSVT

2/18/19: Cardiac Catheterization
- LPCW 14 mm HG, CI 3.5, PVR 1.7
- Normal coronary anatomy
- Endomyocardial Biopsy with myocardial necrosis & granulation tissue (fig 2)

2/19/19 Cardiac MRI
- with extensive delayed enhancement inferior septum, inferior RV and LV & depressed function (fig 3)

3/1/19: Complete heart block
- Epicardial dual chamber ICD placed

3/30/19:Discharged to home on oral heart failure regimen

4/6/19: Readmitted with heart failure symptoms & NSVT
- improvement with milrinone gtt & amiodarone gtt

4/30/19: After considerable discussion, patient Listed for Heart Transplant status 1A by exception
- Continued on maintenance chemotherapy until 7/5/19

7/6/19: Crackles persisted
- 2 subsequent Chest CTs revealed ground glass opacities concerning for Interstitial Lung Disease (ILD)
- Negative Infectious & rheumatologic evaluation
- Made status 7

11/6/19: Lung biopsy revealed peribronchial cells & no ILD (fig 4)
- Lung BAL showed Penicillium & Parainfluenza

1/7/2020 With reassuring lung biopsy, patient was reactivated on the heart transplant waiting list as status 1B

Fig 1. Initial ECHO

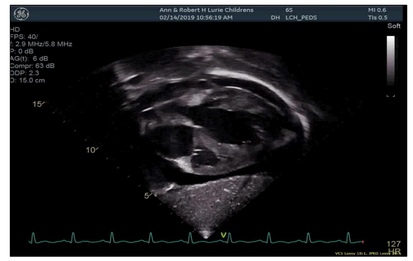


Fig 2. Endomyocardial biopsy

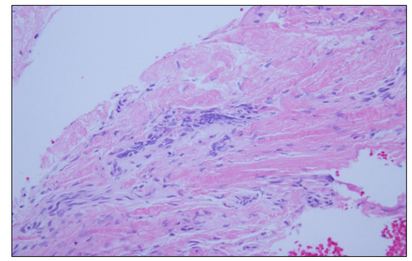


Fig 3. Cardiac MRI

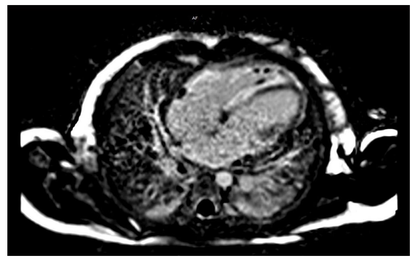
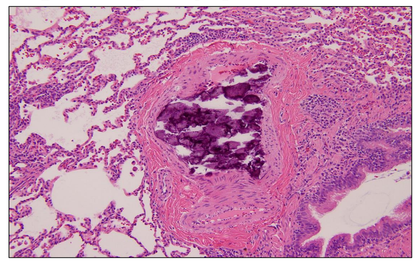


Fig 4. Lung Biopsy



Discussion

- Heart transplantation may need consideration in cancer survivors with refractory heart failure.
- Evaluation & collaboration with oncology is necessary to determine eligibility & timing of listing.

References

[1]Ward, et al Childhood an adolescent Cancer statistics, 2014 CA Cancer J Clin 2014; 64: 83-103
[2]American Cancer Society Cancer Facts and Figures, 2019
[3]Feijen et al. Risk and Temporal Changes of Heart failure Among 5 year Childhood Cancer Survivors: a DCOG-Later Study, J AM Heart Association 2019; 8 e009122
[4]Shah, et al Outcome of heart transplantation in pediatric cancer survivors, Pediatric Transplant 2013

I have nothing to disclose