Influenza vaccination in oncology populations

KATE SULLIVAN MD PHD
THE CHILDREN'S HOSPITAL OF PHILADELPHIA

ANNE REILLY
LESLEY SEGAL KERSUN
DAN VOGLE
EDWARD STADTMUER
CHRISTINA CHU
KENYETTA MCDONALD
ABBAS JAWAD

Existing data

- Influenza clinical disease is more serious in patients on chemotherapy
- Viral shedding can be prolonged
- Titers to vaccines decline during chemotherapy in general
  - Recommendations exist to revaccinate after completion
  - Most centers wait 2-6 months to revaccinate
- Data on efficacy of influenza vaccine limited
  - During chemotherapy
  - Maintenance chemotherapy
  - Post-chemotherapy
Existing Data

- **Adults with malignancy on chemotherapy**

- **Children with malignancy on chemotherapy**
  - 70% seroconversion for solid tumors  Bektas, O Ped Bl Can 2007 49:914
  - 50% seroconversion for lymphoid malignancies  Chisholm, TJC Arch Dis Child 2001 84:496, Steinherz, PG Cancer 1980, 45: 750
  - 60% seroconversion for miscellaneous tumors  Matsuzaki, A Ped Bl Can 2005, 45:831

THREE POPULATIONS

- **We studied three populations with malignancies**
  - Adult patients with multiple myeloma
    - Post-treatment with Melphalan/bortezomib/thalidomide analog and steroid
  - Adult patients with ovarian cancer
    - Post-treatment with cisplatinum
  - Pediatric patients with ALL and AML
    - Studied at various times on and off chemotherapy
ANC and ALC vary widely

Hematologic Parameters

Immunologic consequences: B cells

B cell numbers Multiple Myeloma

B cell numbers Ovarian Cancer

B cell numbers Pediatric Chemotherapy
T cell proliferation is relatively spared

Responses vary widely

Four fold increase in titer
Pediatric patients: Phase of chemotherapy

- **Induction** (glucocorticoid, L-asparaginase, vincristine)
- **Phase I – post-induction** (similar chemotherapy to induction)
- **Phase II- maintenance** (6-MP, MTX, vincristine, steroid)
- **Phase III- off therapy**

- Most Pediatric ALL is a B cell precursor malignancy
- 80% ten year survival

Seroprotection according to time of vaccination
Seroconversion rates according to time of vaccination

Seroconversion correlates with B cells
Summary

- Oncology patients represent a particular challenge for vaccination programs
- 1,500,000 people are diagnosed with cancer each year
  - 10,000 children are on chemotherapy each year
  - Adults
    - 200,000 breast cancer
    - 150,000 colon cancer
    - 60,000 lymphoma
- Responses to influenza vaccination are poor and vary with chemotherapy regimen
  - Significant variation with time on chemotherapy

References

  - Pediatric chemotherapy patients have serious disease with influenza
  - Disease severity