Evaluation and clinical impact of a pharmacist-led, interdisciplinary service focusing on education, monitoring, and toxicity management of immune checkpoint inhibitors

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Key Points

- ✓ **This study supports pharmacist (RPh) intervention when managing oncology patients treated with immune checkpoint inhibitors (ICIs) as part of an interdisciplinary team.**
- ✓ **RPh intervention is associated with a lower odds of ICI treatment discontinuation due to immune related adverse events (irAEs).**

Introduction

- ICIs have a unique toxicity profile of an autoimmune etiology termed irAEs [1-3].
- Early identification and appropriate management of irAEs can result in longer durations of treatment, less emergency department visits and fewer hospitalizations due to irAEs[1].
- *Renna et al.* demonstrated that RPhs are a valuable resource to facilitate education, early identification, monitoring and management of irAEs caused by ICIs[2].

Objectives

1. Determine the number and types of interventions performed by RPhs when providing care to patients receiving ICIs.
2. To evaluate clinically important patient outcomes impacted by RPh involvement.

Methods

- Dual centre, retrospective chart review and matched cohort
- **Two Groups**: Study cohort (Part I/II) and control cohort (Part II)
- **Inclusion criteria:** Received ICI(s) therapy between January 1, 2016-August 31, 2019
- **Exclusion criteria:** ICI clinical trial, no documented RPh intervention in medical record, or ICI(s) therapy as inpatient

Part 1: Spectrum and frequency of RPh interventions

- Study cohort receiving ICI(s) with intensive RPh intervention

Part 2: Retrospective matched cohort

- Study cohort and control cohort matched 1:1 via random number generator based on 3 criteria:
  - ICI treatment, cancer diagnosis, and age (+/- 5 years)
- **Clinical outcomes assessed:** Total # of emergency department visits, hospitalizations due to suspected irAE, treatment discontinuation due to irAE, total ICI cycles received, and completion of ICI therapy

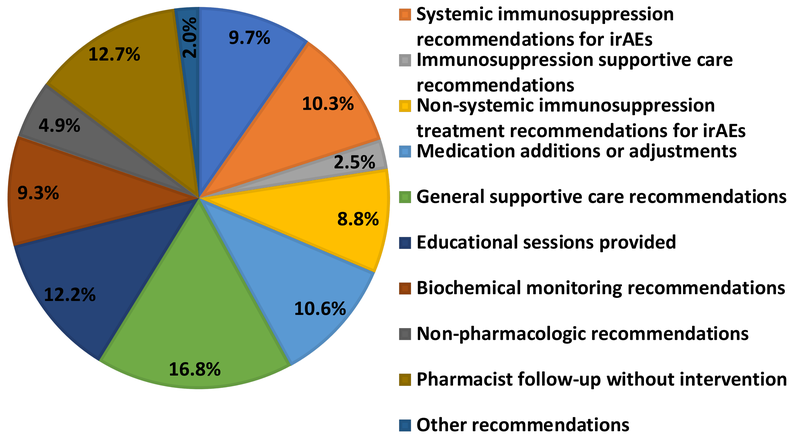
Patients with intensive RPh intervention (study cohort) **vs.** Patients without intensive RPh intervention (control cohort)

Results

Part 1: Spectrum and frequency of RPh interventions

- Eleven key intervention subtypes were documented on 143 patients who received documented RPh intervention.
- In total, 1664 RPh interventions were performed.

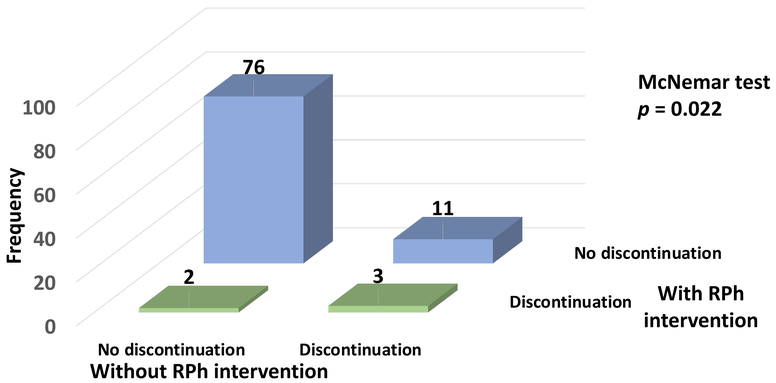
RPh interventions for patients receiving ICI treatment



Part 2: Retrospective matched cohort

- No statistical difference in the median number of emergency department visits not resulting in admission, hospitalizations due to suspected irAE(s), and total ICI cycles received.
- A higher odds of treatment discontinuation due to irAE(s) was identified in patients in the control cohort compared to the study cohort (OR=5.5 95% CI 1.2-24.8, p=0.022).

ICI treatment discontinuations due to irAE(s)



- No statistical difference in the proportion of finite PD-1 or PD-L1 inhibitor treatment courses completed (OR=2.0 95% CI 0.6-6.6, p=0.388).
- Differences in the completion of an ipilimumab treatment could not be assessed due to the small sample size.

Discussion

- Lower odds of ICI treatment discontinuation due to irAE(s) prolongs drug therapy to improve cancer outcomes.
  - Can be used to rationalize funding of RPhs to focus on education and proactive follow up in patients with cancer receiving ICI(s).
  - Contribute to development of evidence based clinical pharmacy key performance indicators (cpKPIs) specific to ambulatory oncology pharmacy
- Wide spectrum of RPh interventions (irAE management, supportive care, education) supports completeness of pharmaceutical care provided to patients receiving ICI(s)
- **Strengths**: Two-part study design and collection of data from two independent investigators (M.L. and J.R.) with discrepancies resolved among the study team.
- **Limitations**: Did not include performance status (ECOG OR KPS) as matching criterion in matched cohort
  - RPh intervention subtypes may not reflect RPh interventions from other centers
  - Limited external validity to patients receiving ICI(s) in combination with other treatment modalities.
  - Only reported ER visits not resulting in admission due to inconsistencies in data reported from health record
  - Sample size for clinical outcomes was reduced post-matching (92 out of possible 143 matches)

Future Directions

- Larger sample size, prospective design to identify true association between RPh intervention and improved outcomes.
- Assess financial impact of RPh intervention on healthcare system utilization.
- Qualitative research assessing patient satisfaction and quality of life to support prioritization of pharmacy services.
- Assess RPh impact when managing patients receiving various ICI based combination therapies (e.g. ICI + Chemo, ICI + TKI).

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