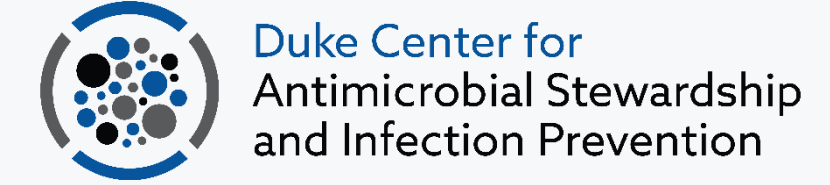


Clinical and Economic Impact of a Ribavirin Intervention Program in Hematopoietic Cell and Solid Organ Transplant Recipients with Respiratory Syncytial Virus Infection

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Abstract

Background: Limited data has shown oral ribavirin (RBV) to be an effective alternative to aerosolized RBV for the treatment of respiratory syncytial virus (RSV) in immunocompromised patients. We evaluated the clinical and economic impact of an RBV intervention program at a large, academic medical center.

Methods: This single-center, retrospective cohort study evaluated hematopoietic cell (HCT) and solid organ transplant (SOT) patients admitted to Duke University Hospital (DUH) with documented or suspected RSV receiving aerosolized and/or oral RBV from 7/1/13-3/31/18. No restrictions or treatment protocols were in place for either formulation. Beginning October 2015, ID consult service approval was required for aerosolized RBV. Education was done at this time to promote oral RBV as the preferred therapy. A cost-minimization analysis was performed using DUH acquisition cost for actual and alternate RBV therapy. Clinical outcomes were also collected.

Results: A total of 118 treatments (115 unique adult and pediatric patients) were included. Demographics were comparable between groups and median age was 52 and 61 years in the oral and aerosol groups, respectively. The predominant transplant type was lung (62.5% and 55.6%, respectively) followed by hematopoietic (16.7% and 27%, respectively). The median (range) duration of therapy was 4 (1-16) days and 5 (1-23) days, respectively. The total cost avoidance attributable to oral RBV use was \$2,522,915.

Conclusions: In our large tertiary care center, use of oral RBV as an alternative treatment strategy to aerosolized RBV in immunocompromised patients with suspected or documented RSV infection led to a cost avoidance exceeding \$2.5 million, with comparable clinical outcomes. Larger prospective trials evaluating oral RBV for RSV treatment are warranted.

Background

- In HCT and SOT recipients, RSV may cause severe disease, contributing to prolonged hospitalization and increased risk of death.
- Aerosolized RBV is the only FDA-approved therapy for lower respiratory tract RSV infections. However it is difficult to administer and costly compared to oral ribavirin without clear clinical benefit.^{1,2}

Methods

- Primary Objective: describe the difference between actual- and alternate-acquisition treatment costs among patient receiving oral and aerosolized RBV
- Secondary Objectives: describe treatment outcomes and treatment-related adverse effects as well as changes in acquisition costs over time
- Single-center, retrospective, quality improvement study
- Study population: adult or pediatric HCT and SOT patients administered aerosolized and/or oral RBV for presumed or confirmed RSV infections from July 1, 2013 to March 31, 2018 were included
- A cost minimization analysis was performed between oral and aerosol groups based on DUH acquisition cost. Alternate therapy regimen determined by current DUH dosing recommendations with sensitivity analysis performed around assumptions on weight-based dosing.

Results

Table 1. Patient demographics & clinical characteristics

	Oral RBV (n = 48)	Aerosol RBV (n = 63)	Both (n=7)
Median age, yr	52.8	61.9	51.6
Male, n (%)	27 (56)	37 (59)	5 (71)
Transplant Type, n (%)			
Lung	30 (63)	35 (56)	5 (71)
Bone Marrow	8 (17)	17 (27)	2 (29)

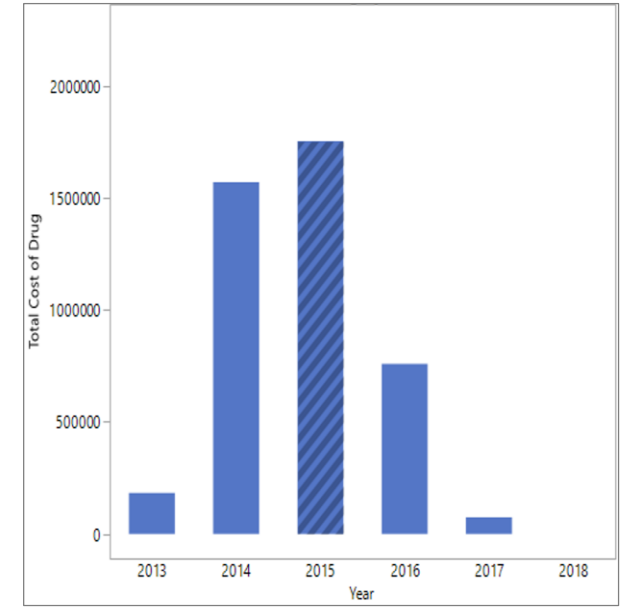
Results (cont.)

Table 2. Treatment Description and Clinical Outcomes

	Oral RBV (n = 48)	Aerosol RBV (n= 63)	Both (n=7)
Duration , median days	4	5	5.5
Unfavorable outcome*, n(%)	24 (51)	43 (68)	5 (71)
30-day all-cause mortality, n(%)	9 (19)	10 (16)	2 (28)
ICU admission, n(%)	4 (8)	8 (13)	2 (28)
New albuterol requirement, n(%)	17 (35)	30 (48)	4 (57)
Anemia (decline in Hgb ≥ 2.0 mg/dL), n(%)	5 (10)	9 (14)	3 (43)

*Composite of elements below

Figure 1. Total cost of RBV by year



- Total oral doses administered = 578 with a median dose of 400mg 3x/day (\$1.42/400mg dose)
- Total aerosol doses administered = 355 with a median dose of 6g/ 1x/day (\$12,255/6g dose)
- Total cost avoidance per 206 patient-days = \$2,522,915

Discussion

- To our knowledge, this is the largest study evaluating economic and clinical outcomes of oral vs aerosolized RBV for RSV in immunocompromised patients.
- Similar to other studies, clinical outcomes and adverse effects were comparable between groups.

Limitations

- Single-center, retrospective (observational) study which does not account for severity of illness in group assignment.

Conclusions

- Use of oral RBV led to substantial cost avoidance with clinical outcomes comparable to aerosolized RBV in immunocompromised patients.

References

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