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Cost Analysis Of Care Expenditures Of Patients With Sickle Cell Disease On Hydroxyurea Therapy In A Specialized Blood Center In Rio De Janeiro, Brazil

Authors,: L. Browne[3]; E, Nascimento[1,2]; P, Moura[1]; J, Duran[1];T, Oliveira[1]; D, Fidlarczyk[1]; R, Barbosa[1]; J, Hankins[3]; Clarisse Lobo[1]

[1]HEMORIO, Rio de Janeiro, RJ, Brazil ; [2]UERJ-Universidade do Estado do Rio de Janeiro, Rio de Janeiro, Brazil; [3] St. Jude Children's Research Hospital, Memphis, TN, US

HEMORIO

INTRODUCTION

Patients with sickle cell disease (SCD) treated with hydroxyurea experience a reduction in hospitalizations, blood utilization, opioid use, and mortality. (Moore et al, 2000, & Wang et al, 2010)

The use of hydroxyurea therapy in high-resource settings reduces total annual costs.

Economic analyses data from low and middle income countries (LMICs) are lacking.

AIM

To assess whether the use of hydroxyurea can reduce overall healthcare expenses for a group of patients with SCD at a specialized hematology center in Brazil.

METHOD

Population selection: patients with SCD with at least 1 clinical encounter (ambulatory visit, ED visit, admission) between 01/01/2018 and 06/30/2018.

1. Cost data:
   - Brazilian Real (R$) to US Dollars ($) conversion on 06/30/2018 = R$ 3,18= $1 US
   - Healthcare resource utilization in the ambulatory clinic, emergency department [ED], and inpatient settings
   - Costs were identified through institutional budgets and calculated per patient.

2. Patients were stratified by hydroxyurea use and hydroxyurea adherence (medication possession ratio, MPR ≥50% and <50%).
   - MPR is the ratio between the number of days of on hydroxyurea and the total number of days in the observation period.

3. Analysis:
   - Wilcoxon rank sum test with continuity reduction calculated total cost (US dollars) per median number of visits
   - One sample proportions t test with continuity reduction compared the number of patients by group

RESULTS

Of the 3331 active patients in the cohort, 3032 had ≥ 1 encounter during the analysis period.
- 1561 females (51.5 %)
- Median age 15 (0-76 Years)
- Figure A: Distribution of SCD genotypes

Hydroxyurea utilization
- 614 patients (20.2%) were prescribed hydroxyurea
- Hydroxyurea use was associated with:
  - Increase median and total ambulatory visits (p= 0.0001) (Figure B & C), and
  - Decrease median and total ED visits and admissions (p=0.0001) (Figure B & C)

Ambulatory Costs
- Increased in patients treated with hydroxyurea than those not treated (p=0.0001) (Table 1)
- Patients with MPR ≥50% had higher ambulatory costs than those with MPR<50% (p= 0.0092) (Table 2)

Acute care and admission costs (Table 1)
- No differences in acute care and admission costs according to hydroxyurea utilization
- No differences in acute care and admission costs according to medication adherence

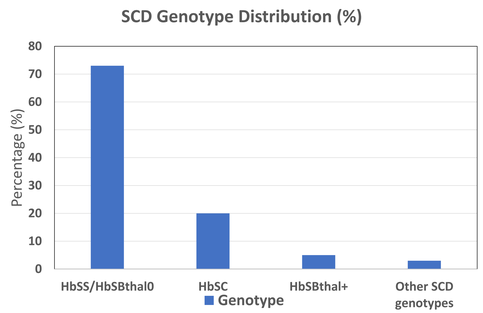

Figure A. Distribution of SCD genotypes cohort

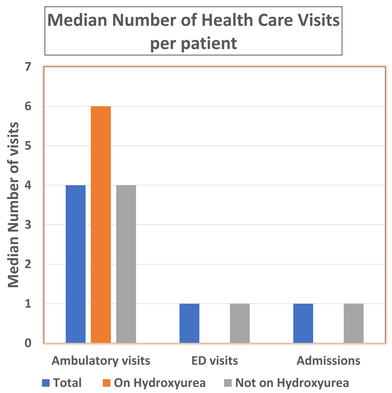

Figure B. on Left shows Comparison of median health care visits per patients on Hydroxyurea and not on Hydroxyurea (all p values < 0.0001)

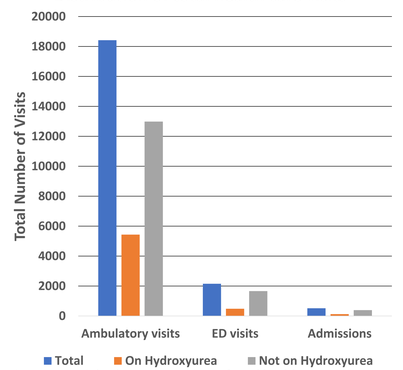

Figure C. on Right shows Comparison of total health care visits per patients on Hydroxyurea and not on Hydroxyurea (all p values < 0.0001)

	Total (n=3032)	Treated with hydroxyurea (n=614)	Not treated with hydroxyurea (n=2418)	p -value
Care costs (median cost/patient in US$)				
Global Cost	497.11	1198.53	307.79	**< 0.0001***
# patients (%)	3032	614 (20.3)	2418 (79.7)	
Ambulatory visits	307.87	973.95	212.78	**< 0.0001***
# patients (%)	2994	613 (20.5)	2381 (79.5)	
ED visits	342.68	364.03	338.17	0.7520*
# patients (%)	1144	265 (23.2)	879 (76.8)	
Admissions	1978.79	1923.61	1991.8	0.7498*
# patients (%)	381	89 (23.4)	292 (76.6)	

*Table 1. Treatment costs stratified by hydroxyurea utilization over 6 months from 01/01/18-06/30/18 *Pearsons Chi-Squared Test*

	Total (n=614)	hydroxyurea MPR ≥50% (n=98)	hydroxyurea MPR <50% (n=516)	p-value
Global Cost	1198.53	1312.11	1164.89	0.2216*
# patients (%)	614	98 (16)	516 (84)	
Ambulatory visits	973.95	1120.84	951.43	**0.0092***
# patients (%)	613	98 (16)	515 (84)	
ED visits	364.03	266.73	371.65	0.3124*
# patients (%)	265	39 (14.7)	226 (85.3)	
Admissions	1923.61	1522.36	1942.1	0.7224*
# patients (%)	89	11 (12.4)	78 (87.6)	

*Table 2. Treatment costs stratified by hydroxyurea adherence over 6 months from 01/01/18-06/30/18 *Pearsons Chi-Squared Test*

CONCLUSIONS

Among people with SCD followed at a specialized center in Brazil, treatment with hydroxyurea:
1. Decreased acute care utilization and admissions especially in patients with higher hydroxyurea adherence; however, this did not translate into lower care costs
2. Increased Ambulatory Costs were likely due to drug costs and frequent clinical and laboratory monitoring

While hydroxyurea is important for SCD management, there are unmet needs as patients on hydroxyurea continue to have multiple ED visits and admissions.

Further analysis is needed to investigate the effect of disease severity, use of expensive drugs, and age as confounders of relationship between hydroxyurea and health care costs.

REFERENCES

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Agios

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CONTACT INFORMATION

La'ron.browne@stjude.org , lobo.clarisse@gmail.com, emiliamatos@yahoo.com , Jane.hankins@stjude.org

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