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Central Georgia Infectious Diseases

Low 30-Day Hospital Readmission Rates in Medicare Patients Receiving Outpatient Parenteral Antimicrobial Therapy (OPAT) in Physician Office Infusion Centers

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Abstract

Introduction: The Hospital Readmissions Reduction Program (HRRP) was established under the Affordable Care Act in 2012 to reduce payments to hospitals (hosp) with excess readmissions. Standardized readmission measures include all-cause unplanned readmissions within 30 days of hosp discharge, regardless of initial diagnosis. To avoid penalties, post-acute care, including OPAT, must have a neutral or favorable impact on 30-day hosp readmissions (30-dHR). We assessed 30-dHR for Medicare patients (pts) receiving OPAT in ID physician office infusion centers (POICs).

Methods: All records of pts were identified that were discharged from hosp to 15 national ID POICs. From those, 200 records were randomly selected and reviewed for unplanned 30-dHR. Additional data extracted were demographics, Charlson comorbidities index (CCI), infection diagnosis, therapy and reasons for readmission. The 30-dHR rate was compared to national average estimates obtained from the Medical Expenditure Panel Survey (MEPS) database. Multivariate logistic regression was performed with p<0.05 being statistically significant.

Results: Mean pt age was 73.5 years (range: 65-97) with 56% males. Infections included bone & joint (34%), genitourinary (16%), complicated skin and skin structure (15%), bacteremia (13%), respiratory (10%), intra-abdominal (7%), endocarditis (2.5%), and central nervous system (2.5%) with a mean OPAT duration of 21±18 days. Overall 30d-HR rate was 11% (n=22). Median days from initial hosp discharge to readmission was 13 (range 2-28). Reasons for 30d-HR included disease exacerbation unrelated to infection (n=7, 32%), worsening infection (n=6, 27%), adverse drug reaction (n=5, 23%), new infection (n=3, 14%), and line complication (n=1, 4%). A logistic regression model (Table 1) indicates that 30d-HR rates reported in MEPS are significantly higher than observed for pts treated with OPAT in POICs after adjustment for age, gender, CCI and initial diagnosis (OR=3.16, 95%CI: 1.89-5.28, p<0.0001).

Conclusion: Pts receiving OPAT in POICs had significantly lower 30d-HRs compared to a national average, with a more comorbid population. Our data suggest that continuous oversight of pts by ID physicians and infusion center staff in the POIC setting may prevent hospital readmissions.

Background

The HRRP serves as a measure to improve pt care through linking payment to the quality of hospital care [1]. This may include reduction of payment up to 3% for all Medicare pts to a hospital with excess readmissions. The all-cause unplanned 30-day hospital readmission (30d-HR) is a standardized measure for six diagnoses, including myocardial infarction, chronic obstructive pulmonary disease, heart failure, pneumonia, coronary artery bypass graft surgery, and elective primary total hip and/or knee arthroplasty. Outpatient care has an impact on 30-dHR for pts discharged on intravenous antimicrobials.

This study assesses the all-cause 30-dHRs for Medicare pts receiving OPAT in ID physician office infusion centers and compares our results to national average estimates.

Methods

Study design
We conducted a retrospective chart review of 200 randomly selected Medicare beneficiaries ≥65 years of age from 15 Infectious Disease (ID) POICs across the nation who were discharged from a hospital to receive OPAT in 2017.

Data collection
Demographics, comorbidities, Charlson comorbidities index (CCI), infection diagnosis, length of inpatient stay, OPAT regimen, adverse drug reactions and 30-d HRs with associated reasons were collected.

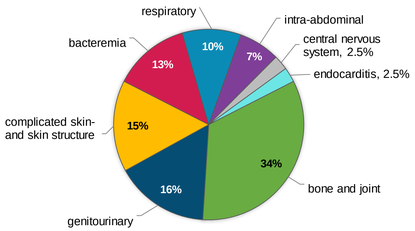
Study analysis
All-cause 30-dHR after discharge date was evaluated and compared to national average estimates obtained from the Medical Expenditure Panel Survey (MEPS) database. This was statistically analyzed with continuous data reported as mean or medians and categorical data as counts and percentages. A multivariate logistic regression model was used to compare OPAT and MEPS data with p<0.05 considered statistically significant. Fisher's exact test was used to compare 30d-HR between POIC and MEPS stratified by infection diagnosis.

Study Population

Patient Characteristics

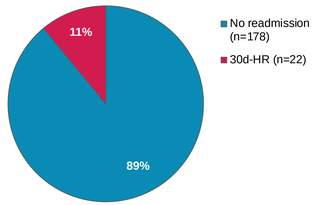
Variable	Results (n=200)
Age in years, mean ± SD	73.5 ± 6.5
Male gender, n (%)	112 (56)
Charlson index, mean ± SD	4.6 ± 1.9
Prior length of hospitalization, days ± SD	6 ± 4
Medical history, n (%)	
hypertension	129 (65)
diabetes mellitus	69 (35)
obesity	54 (27)
cancer	42 (21)
cardiovascular disease	39 (20)
renal disease	34 (17)
COPD	17 (9)
CHF	11 (6)

Infection Diagnosis



- Overall mean duration of OPAT was 21±18 days

30-Day Hospital Readmissions



- Median time from hospital discharge to readmission was 13 days (range: 2-28 days).

30-Day Hospital Readmissions (30d-HRs)

30d-HR Rate by Infection Diagnosis

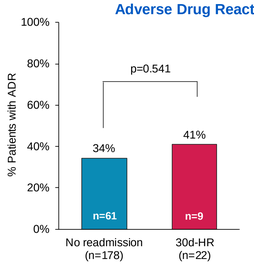
Infection Diagnosis	No. of Pts	Readmissions (No. of Pts)	30d-HR Rate
Bone & joint	**67**	**5**	**7%**
osteomyelitis	29	2	
prosthetic joint	20	3	
septic arthritis	16	-	
discitis	2	-	
Genitourinary	**32**	**6**	**19%**
urinary tract infection	26	5	
pyelonephritis	5	1	
abscess	1	-	
Complicated skin and skin structure	**31**	**3**	**10%**
cellulitis	28	2	
abscess	3	1	
Bacteremia	**26**	**3**	**12%**
genitourinary source	9	1	
catheter-related	6	2	
post surgery	4	-	
respiratory source	4	-	
other	2	-	
Respiratory	**20**	**3**	**15%**
pneumonia	15	3	
head, ears, eys, nose, throat	3	-	-
Intra-abdominal	**14**	**1**	**7%**
Central nervous system	**5**	**-**	**0%**
Endocarditis	**5**	**1**	**20%**

Reasons for 30d-HRs

Reasons for 30d-HR	No. of Patients (n=22)
Unrelated to OPAT	**7 (32%)**
Exacerbation of other chronic condition	7 (32%)
Related to OPAT	**15 (68%)**
Worsening infection*	6 (27%)
Adverse drug reaction	5 (23%)
New infection	3 (14%)
Central catheter complication	1 (4%)

* including bone and joint (n=3), genitourinary (n=1), respiratory (n=1), and complicated skin and skin structure infections (n=1).

Adverse Drug Reactions (ADRs)



- Overall, 70 of 200 pts (35%) experienced ADRs during OPAT
- 9/22 pts (41%) with 30d-HRs had ADRs, of which 5 were the admitting diagnosis
- 61/178 pts (34%) without a 30d-HR reported an ADR
- These data indicate that experiencing an ADR did not increase the likelihood of a 30d-HR during OPAT

Comparison of 30d-HR Rates

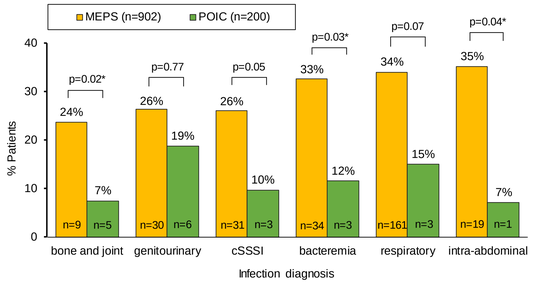
Multiple Logistic Regression Analysis of 30d-HRs in Study Cohort (POIC) *vs.* National Database (MEPS*)

Variable	POIC (n=200)	MEPS* (n=902)	Odds Ratio (OR)	95% CI	p Value
30d-HR, n (%)	22 (11%)	284 (28.6%)	3.16	1.89 - 5.28	**<0.0001**
Age in years, mean ± SD	73.5 ± 6.5	76.3 ± 2.1	0.99	0.97 - 1.02	0.866
Male gender, n (%)	112 (56)	362 (40)	1.08	0.81 - 1.44	0.602
Charlson index, mean ± SD	4.6 ± 1.9	2.1 ± 1.7	1.09	1.01 - 1.18	**0.037**
Infection diagnosis, n (%)					
bone and joint	67 (34)	38 (5)	0.79	0.42 - 1.48	0.466
genitourinary	32 (16)	114 (12)	0.93	0.58 - 1.50	0.789
compl. skin and skin structure	31 (15)	119 (13)	0.87	0.52 - 1.44	0.593
bacteremia	26 (13)	104 (11)	1.23	0.78 - 1.94	0.367
respiratory	20 (10)	473 (53)	1.43	0.92 - 2.20	0.109
intra-abdominal	14 (7)	54 (6)	0.45	0.31 - 0.68	**0.0001**
central nervous system	5 (2.5)	n/a			
endocarditis	5 (2.5)	n/a			

*: Medical Expenditure Panel Survey, MEPS population was queried for POIC diagnoses for analysis; n/a; not available in MEPS; CI: confidence interval.

- MEPS provides representative estimates on national households conducted annually by the Agency for Healthcare Research Quality including overall 30d-HRs
- Multiple logistic regression revealed that pts treated outside of POIC were 3.16 times more likely to have a 30d-HR after adjustment of age, gender, Charlson index, and infection diagnosis. Patients with a higher Charlson index (OR: 1.09, p=0.037), and those with intra-abdominal infections (OR: 0.45, p=0.0001) were at a higher risk for 30d-HRs.

Comparison of 30-HR Rates between POIC and MEPS



*significantly different using Fisher's exact test

- POIC-related 30d-HR rates were consistently lower compared to MEPS readmission rates for all infection diagnoses assessed
- 30d-HR rates observed in the POIC cohort were significantly lower for bone and joint infections (p=0.02), bacteremia (p=0.03), and intra-abdominal infections (p=0.04)

Discussion

Hospital readmissions are costly to the healthcare system and are used as quality indicators impacting Medicare reimbursements. This study evaluates the 30d-HR rate of Medicare beneficiaries receiving OPAT at multiple POICs nationwide and compares our results to national estimates.

- 200 Medicare beneficiaries from 15 sites were evaluated, mean age was 73.5 years, 56% were male and the cohort had a relatively high Charlson comorbidity index (4.6).
- Diagnostic distribution was varied, with the largest group receiving OPAT for bone and joint infections.
- Overall 30d-HR rate of POIC study cohort was low at 11%. Approximately one-third of the readmissions were unrelated to OPAT. The leading reason for OPAT-related 30d-HRs was worsening infection followed by ADRs.
- Occurrence of an ADR during OPAT was not associated with a higher 30d-HR rate, as pts from the readmitted and not readmitted groups had comparable number of ADRs (41% vs. 34%, p=0.541)
- 30d-HR rates for POIC were compared against the MEPS database. A multiple logistic regression model indicated the risk of 30d-HR as reported in MEPS is significantly higher than that observed for pts treated in POICs after adjustment for age, gender, Charlson index and infection diagnosis (OR=3.16, 95%CI: 1.89-5.28, p<0.0001). In both populations, patients with a higher Charlson index and those with intra-abdominal infections were at a greater risk of 30d-HR.
- This study may be limited by information bias as MEPS hospitalization data are imputed from available administrative sources and diagnostic information may not be complete.

Conclusion

- **Medicare patients receiving OPAT in POICs had significantly lower 30d-HRs compared to national average estimates despite a more comorbid population.**
- **ADRs during OPAT were not associated with a higher rate of 30d-HRs in our study cohort. Conversely, the risk of readmission was higher for more comorbid patients and for those with intra-abdominal infections.**
- **Our data suggest that continuous oversight of pts by ID physicians and staff in the POIC setting may prevent or reduce hospital readmissions.**

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