Impact of COVID-19 on Oral Oncolytic Adherence

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Background

- CVS Health recently developed a best-in-class mobile app and website that enables oncology patients to start and stay on therapy
- Identifying and estimating the frequency of its use and the impact of COVID-19 on adherence are critical

Objective

- This study examined the impact of COVID-19 on adherence to oral oncolytic agents in a large health plan with a significant digital health platform

Methods

- Retrospective cohort study included adult patients with chronic myelogenous leukemia (CML), ovarian cancer or prostate cancer initiating oral oncolytics between 3/1/19 and 3/1/2021
- Patients were divided into two groups: pre-COVID oral oncolytic initiators before 3/1/20 and COVID initiators after 3/1/20 and were followed for 1 year after therapy initiation
- Primary outcome was optimal adherence to oral oncolytic agents as defined by a medication possession ratio (MPR) ≥ 0.8
- Percent of digital engagement, defined as the number of times a patient interacted with the CVS digital platform, was examined as a secondary endpoint and was considered as a binary and categorical endpoint (none, low [<28 interactions], moderate [28-105 interactions] and high [>105 interactions])
- Descriptive statistics and logistic regression modeling were performed; p-values < 0.05 were significant

Results

- 15,494 patients were included in the study; 52.1% in the pre-COVID initiator group
- Pre-COVID initiators were less likely to be male (p < 0.01) and receive copay assistance (p < 0.01)
- No difference in digital enrollment pre and during COVID was noted (p = 0.18)
- Pre-COVID initiators were less likely to be optimally adherent than COVID initiators (p = 0.04)
- Therapy persistence was more common among COVID initiators, with greater number of fills (p < 0.01) and less therapy changes (p = 0.02)
- COVID initiation of oral oncolytics was not associated with optimal adherence (Figure 1)
- Adherence increased as digital engagement increased (Figure 1)
- Other factors associated with increased adherence were copay assistance, male gender and age between 65 and 84 (all p < 0.05)
- Factors associated with decreased adherence were therapy change, CML and age < 50 years (all p < 0.05)

Table 1. Patient demographics among COVID study groups

Variable	Overall	Pre-COVID (N = 8067 [52.1%])	Post-COVID (N=7427 [47.9%])	p-value
Age*	65.8 (13.7)	65.9 (13.8)	65.6 (13.7)	0.16
Age group$				0.087
<50	1650 (10.6)	859 (10.6)	791 (10.6)	
50-64	5495 (35.5)	2838 (35.2)	2657 (35.8)	
65-74	4097 (26.4)	2082 (25.8)	2015 (27.1)	
75-84	3014 (19.4)	1623 (20.1)	1391 (18.7)	
>84	1238 (8.0)	665 (8.2)	573 (7.7)	
Male Gender$	11820 (76.3)	6076 (75.3)	5744 (77.3)	**0.0033**
Cancer Type$				0.052
Prostate	9947 (64.2)	5127 (63.6)	4820 (64.9)	
CML	3574 (23.1)	1864 (23.1)	1710 (23.0)	
Ovarian	1973 (12.7)	1076 (13.3)	897 (12.1)	
Copay Assistance$	6192 (40.0)	3095 (38.4)	3097 (41.7)	**0.00002**

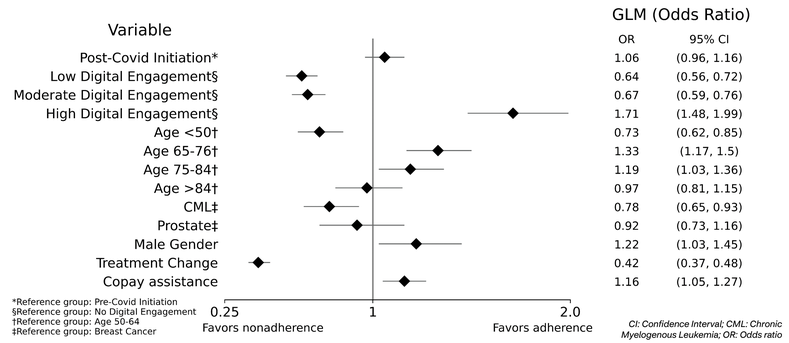
CML: Chronic Myelogenous Leukemia; - Mean (SD): T-test; $ - N (%) : Chi²*

Table 2. Therapy adherence, persistence and digital engagement outcomes

Variable	Overall	Pre-COVID	Post-COVID	p-value
Optimal Adherence$	13221 (85.3)	6837 (84.75)	6384 (85.96)	**0.036**
Overall MPR*	0.97 (0.25)	0.97 (0.26)	0.97 (0.25)	0.89
Overall MPR^	1.00 (0.90-1.03)	1.00 (0.90-1.03)	1.00 (0.91-1.03)	0.33
Total Days Supply$	270 (120-360)	270 (120-360)	300 (120-360)	**0.0035**
Number of fills^	9 (4-12)	9 (4-12)	10 (4-12)	**0.00003**
Total Gap Days^	3 (-8-30)	3 (-9-31)	3 (-8-29)	**0.038**
Digital Engagement$	11480 (74.1)	6014 (74.5)	5466 (73.6)	0.18
Total Digital Interactions^	28 (0-105)	29 (0-100)	26 (0-113)	0.30
Digital Engagement Category$				0.21
None	4014 (25.9)	2160 (26.8)	1961 (26.4)	
Low	3779 (24.4)	1911 (23.7)	1671 (22.5)	
Moderate	3831 (24.7)	1943 (24.1)	1836 (24.7)	
High	3870 (25.0)	2053 (25.4)	1959 (26.4)	
Changed Therapy$	1462 (9.4)	803 (9.9)	659 (8.9)	**0.023**

*MPR: Medication Possession Ratio; * - Mean (SD): T-test; ^ - Median (Q2-Q3): Mann-U test; $ - N (%) : Chi²*

Figure 1: Odds ratio forest plot for adherence model



CI: Confidence Interval; CML: Chronic Myelogenous Leukemia; OR: Odds ratio

Table 3. Patient demographics among digital engagement groups

Variable	Digitally Engaged (N=11480 [74.1%])	No Digital Engagement (N=4014 [25.9%])	p-value
Age*	64.8 (13.8)	68.4 (13.3)	**<0.00001**
Age group$			**<0.00001**
<50	1341 (11.7)	405 (10.1)	
50-64	4401 (38.3)	1238 (30.8)	
65-74	2859 (24.9)	1094 (27.2)	
75-84	2046 (17.8)	968 (24.1)	
>84	833 (7.3)	309 (7.7)	
Male Gender$	8527 (74.3)	3293 (82.0)	**<0.00001**
Cancer Type$			**<0.00001**
Prostate	7031 (61.2)	2916 (72.6)	
CML	2818 (24.5)	756 (18.8)	
Ovarian	1631 (14.2)	342 (8.5)	
Copay Assistance$	4803 (41.8)	1389 (34.6)	**<0.00001**

- Patients who engage digitally with CVS Health are:
  - Younger
  - More likely to be female
  - More likely to belong to ovarian cancer or CML groups
  - More likely to receive some copay assistance

Table 4. Therapy adherence and persistence outcomes between digital engagement groups

Variable	Digitally Engaged	No Digital Engagement	p-value
Optimal Adherence$	9725 (84.7)	3496 (87.1)	**0.00027**
Overall MPR*	0.96 (0.23)	1.02 (0.32)	**<0.00001**
Overall MPR^	0.99 (0.90-1.03)	1.00 (0.92-1.05)	**<0.00001**
Total Days Supply$	280 (120-360)	252 (90-360)	**0.00001**
Number of fills^	9 (4-12)	8 (3-12)	**<0.00001**
Total Gap Days^	4 (-8-32)	1 (-11-26)	**0.013**
Changed Therapy$	1063 (9.3)	399 (9.9)	0.22

- Optimal adherence was higher among patients without digital engagement
- During the follow up year, digitally engaged patients had more day supply dispensed and fills

Conclusions

- COVID had minimal effect on adherence to oral oncolytics
- Fewer patients altered therapy in the post-COVID initiation group
- Digital engagement appears to mediate some adherence impact, with high levels of engagement increasing adherence compared to no engagement
- Low and moderate levels of digital engagement appear to decrease adherence compared to no engagement

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