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Management of Polycythemia Vera: Virtual Simulation Improves Clinical Decisions of Hematologists/Oncologists

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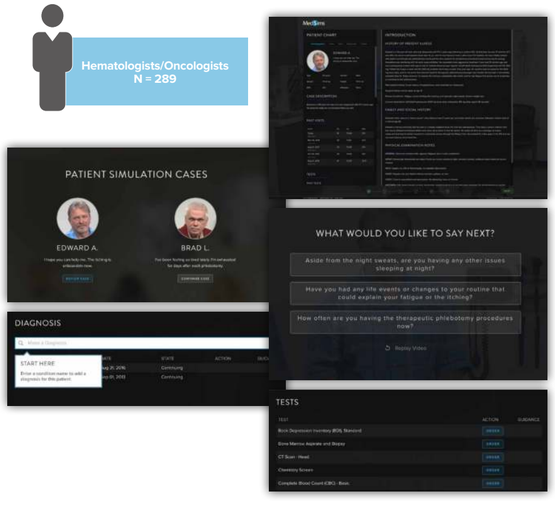
BACKGROUND

Polycythemia vera (PV) is a type of myeloproliferative neoplasm that is characterized by a complicated, nonspecific symptom profile and a risk of transformation to acute myeloid leukemia. The diagnosis and management of PV have evolved over recent years; therefore, this study was conducted to determine if an online, simulation-based continuing medical education (CME) intervention could improve performance of hematologists/oncologists (Hem/Oncs) in the management of patients with PV.

METHODS

The CME-certified virtual patient simulation (VPS), consisting of 2 patients with PV, was presented via a platform that allowed Hem/Oncs to assess patients and make diagnostic and therapeutic decisions from an extensive database of diagnostic and treatment possibilities matching the scope and depth of practice. Tailored clinical guidance (CG) was provided after each decision. Pre-CG and post-CG decisions were compared using a 2-tailed paired t-test to determine level of significance (*P* values). Data were collected between October 26, 2017 and July 20, 2018.

Hematologists/Oncologists
N = 289



RESULTS

CASE 1 – BRAD L. (HEM/ONCS, N = 116)

Hem/Oncs demonstrated statistically significant changes from pre-CG to post-CG for (Figures 1 and 2):

- (Figure 1) Diagnosing inadequately controlled PV, 196% relative increase; *P* < .001
- (Figure 2) Selecting optimal treatment strategies for patients with PV already treated with hydroxyurea
  - Discontinue hydroxyurea (43% relative increase; *P* < .001) and start PV treatment options (73% relative increase; *P* < .001)

Hem/Oncs demonstrated small changes from pre-CG to post-CG for (Figure 3):

- Assessing symptom burden in patients with PV
  - MPN-SAF TSS (6% relative increase; nonsignificant) and PHQ-9 (30% relative increase; *P* = .011)

Treatment Selection: Ruxolitinib (Figure 4)

- There was a relative increase of 78% for Hem/Oncs' selection of ruxolitinib between pre-CG and post-CG (45% vs 80%)
- Top 3 rationales for selecting ruxolitinib* (*could select 1-2 rationales)
  - Guideline recommended 23%
  - Impact on quality of life 23%
  - To reduce disease symptoms 22%
- Of the Hem/Oncs who ordered ruxolitinib, 42% ordered an inappropriate dose for PV post-CG.

FIGURE 1 — Pre-CG / Post-CG

Diagnosing inadequately controlled PV

Decision Points	Responses/Improvement	*P*-Value
Diagnose: Polycythemia Vera, inadequately controlled	21% → 41%	< .001

FIGURE 2 — Pre-CG / Post-CG

Selecting optimal treatment strategies for patients with PV already treated with hydroxyurea

Decision Points	Responses/Improvement	*P*-Value
Discontinue: hydroxyurea	54% → 23%	< .001
Start: PV Treatment Option	45% → 33%	< .001

FIGURE 3 — Pre-CG / Post-CG

Assessing symptom burden in patients with PV

Decision Points	Responses/Improvement	*P*-Value
Order: Myeloproliferative Neoplasm Symptom Assessment Form (MPN-SAF TSS)	74% → 4%	.219
Order: Patient Health Questionnaire (PHQ-9)	48% → 15%	.011

FIGURE 4 — Pre-CG (n = 52) / Post-CG (n = 93)

Treatment Selection: Ruxolitinib

Decision Points	Responses/Improvement
ruxolitinib (dosed correctly)	23% → 47%
ruxolitinib (dosed too low)	21% → 32%
ruxolitinib (dosed too high)	1% → 3%

CASE 2 – EDWARD A. (HEM/ONCS, N = 173)

Hem/Oncs demonstrated statistically significant changes from pre-CG to post-CG in a majority of areas (Figures 1-4):

- (Figure 1) Ordering appropriate genetic tests for PV diagnosis (66% relative increase; *P* < .001)
- (Figure 2) Diagnosing resistance to hydroxyurea (2267% relative increase; *P* < .001)
- (Figure 3) Assessing symptom burden in patients with PV
  - MPN-SAF TSS (18% relative increase; *P* = .021) and PHQ-9 (69% relative increase; *P* < .001)
- (Figure 4) Selecting optimal treatment strategies for patients with PV already treated with hydroxyurea
  - Discontinue hydroxyurea (134% relative increase; *P* < .001) and start PV treatment option (200% relative increase; *P* < .001)

Treatment Selection: Ruxolitinib (Figure 5)

- There was a relative increase of 182% for Hem/Oncs' selection of ruxolitinib between pre-CG and post-CG (28% vs 79%)
- Top 3 rationales for selecting ruxolitinib* (*could select 1-2 rationales)
  - Impact on quality of life 27%
  - Guideline recommended 20%
  - To reduce disease symptoms 20%
- Of the Hem/Oncs who ordered ruxolitinib, 43% ordered an inappropriate dose for PV post-CG.

FIGURE 1 — Pre-CG / Post-CG

Ordering appropriate genetic tests for PV diagnosis

Decision Points	Responses/Improvement	*P*-Value
Order: *JAK2* Mutation	32% → 21%	< .001

FIGURE 2 — Pre-CG / Post-CG

Diagnosing resistance to hydroxyurea

Decision Points	Responses/Improvement	*P*-Value
Diagnose: Resistance to Hydroxyurea	2% → 39%	< .001

FIGURE 3 — Pre-CG / Post-CG

Assessing symptom burden in patients with PV

Decision Points	Responses/Improvement	*P*-Value
Order: Myeloproliferative Neoplasm Symptom Assessment Form (MPN-SAF TSS)	58% → 10%	.021
Order: Patient Health Questionnaire (PHQ-9)	24% → 17%	< .001

FIGURE 4 — Pre-CG / Post-CG

Selecting optimal treatment strategies for patients with PV already treated with hydroxyurea

Decision Points	Responses/Improvement	*P*-Value
Discontinue: hydroxyurea	31% → 41%	< .001
Start: PV Treatment Option	24% → 49%	< .001

FIGURE 5 — Pre-CG (n = 48) / Post-CG (n = 136)

Treatment Selection: Ruxolitinib

Decision Points	Responses/Improvement
ruxolitinib (dosed correctly)	14% → 45%
ruxolitinib (dosed too low)	10% → 29%
ruxolitinib (dosed too high)	3% → 4%

CONCLUSION

- This study demonstrates that VPS that immerses and engages Hem/Oncs in an authentic and practical learning experience improved evidence-based clinical decisions related to the management of PV.
- This VPS increased the percentage of Hem/Oncs who ordered *JAK2* mutation testing, diagnosed inadequately controlled PV, and assessed symptom burden; however, further education is needed to increase the competence of Hem/Oncs in these areas, as well as in the appropriate dosing of ruxolitinib for PV.

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