



## The 65th ASH Annual Meeting Abstracts

## POSTER ABSTRACTS

## 634.MYELOPROLIFERATIVE SYNDROMES: CLINICAL AND EPIDEMIOLOGICAL

**Perioperative Outcomes and Management in Patients with Myeloproliferative Neoplasms: A Multicentric Retrospective Analysis of 354 Surgical Interventions**

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**Background:**

Classic myeloproliferative neoplasms (MPN) polycythemia vera (PV), essential thrombocythemia (ET), and myelofibrosis (MF), are characterized by concurrent risk of thrombotic and hemorrhagic complications. These risks are reported to be further compounded perioperatively (*Blood*, 2008), though scarce contemporary data exist. Further, the lack of evidence-based guidelines leads to heterogeneous management. The objective of this study was to comparatively assess perioperative complication rates (thrombotic, hemorrhagic, and survival) and management practices in a large MPN population.

**Methods:**

Consecutive surgical interventions in patients with WHO-defined PV, ET and MF recruited from the Quebec MPN Research Group Registry (6 centers; between 1986-2023) were analyzed. Endpoints (90 days post-surgery) and surgical definitions were per convention. Standard statistics were used (JMP® Pro 14.1.0 software; SAS Institute, Cary, NC, USA).

**Results:**

A total of 354 procedures were captured in 184 patients: PV, n=87 (47%); ET, n=66 (36%); MF, n=31 (17%). Cardiovascular risks were balanced; previous venous thrombosis was enriched in PV (p=0.04; Table 1A). Major surgeries were performed in 45 cases (30%), primarily PV (p=0.004); most being general (69%) (Table 1B). Interventions were urgent in 41 cases (28%); 49 (42%) of 195 evaluable were under general anesthesia. The majority of PV/ET subjects continued antiplatelet and cytoreductive agents peri-intervention, though cytoreduction was stopped in 12-22%. Thromboprophylaxis was administered in n=42 (23%). Surgical bleeding occurred in n=8 (2%). At 90-day follow-up, arterial/venous thrombosis occurred each in n=3 (1%), hemorrhage in n=25 (8%), and death in n=4 (1%). Overall complication rate was 12% (n=40). PV patients displayed significantly higher rates of surgical bleeding (6%; p=0.0006) and perioperative hemorrhage (13%; p=0.04).

**Factors impacting 90-day surgical outcomes:** **Hemorrhage-free survival (HFS):** PV: General anaesthesia (p=0.04) and anti-thrombotic prophylaxis (p=0.05) negatively impacted HFS on multivariate testing (Table 2). ET: Driver mutation status CALR vs JAK2 (HR 24.6; 95% CI 1.2-504; p=0.05) and urgent interventions (HR 11.5; 95% CI 0.93-144; p=0.03) emerged as independent predictors for HFS. MF: Discontinuation of antiplatelet agents perioperatively was the sole factor impacting HFS (p=0.01). **Perioperative complication-free survival (CFS; composite endpoint):** PV: While several factors were significant on univariate testing (procedure, leukocytosis, ruxolitinib exposure, cytoreduction modification, thromboprophylaxis), multivariate testing disclosed only lower hematocrit (< 35%; p=0.05) to impact complication rates. ET: Urgent (p<0.0001) and major procedures (p=0.009), thromboprophylaxis use (p=0.001), platelet count > 450 x 10<sup>9</sup>/L (p=0.02), and absence of antiplatelet (p=0.02) were significant independent predictors of CFS. MF: Antiplatelet discontinuation (HR 6.5; 95% CI 0.8-50.4; p=0.02), nature of cytoreduction (ruxolitinib vs hydrea; p=0.04) and cytoreduction discontinuation pre-operatively (p=0.006) negatively impacted CFS on multivariate analysis. Limited informative events for thrombosis/survival precluded analyses.

**Conclusions:**

This is, to our knowledge, the largest and most contemporary analysis of surgical procedures in patients with MPN. Firstly, it confirms prevalent bleeding perioperatively, though balanced by fewer thrombotic events, calling for further study of thromboprophylaxis/antiplatelet practices in this setting. Second, it discloses key management patterns, notably routine discontinuation of cytoreduction, which had a detrimental impact on outcomes. Third, correlation of uncontrolled platelets and overzealous hematocrit control with higher complication rates in ET and PV, respectively, underscores importance of judicious target control. Further, *CALR* driver mutation status associated with bleeding risk in ET, independent of platelet count, suggesting additional contributing mechanisms. Finally, ruxolitinib use was an independent predictor of perioperative complications in MF, though this may reflect skewing towards higher-risk populations. Further studies will be required to validate findings, with this data serving as a preliminary signal for awareness of risk and reappraisal of management strategies.

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**Table 1A. Clinical characteristics of surgical patients with myocardial infarction at diagnosis**

Variable	N	Prevalence of MI (%)	Relative prevalence among patients with MI (%)	Relative prevalence among patients without MI (%)	P value
Age at diagnosis, years (median [range])	44 (28-69)	41 (27-55)	42 (24-63)	34 (28-40)	0.1
Male, n (%)	47 (46)	46 (47)	53 (49)	39 (42)	0.4
Other medical conditions					
Hypertension, n (%)	17 (33)	16 (34)	19 (33)	13 (24)	<.0001
Diabetes, n (%)	4 (8)	4 (9)	4 (7)	2 (4)	0.05
Chronic kidney disease, n (%)	1 (2)	1 (2)	1 (2)	0	0.3
Coronary artery disease, n (%)	17 (33)	17 (36)	19 (33)	13 (24)	<.0001
Congestive heart failure, n (%)	10 (19)	10 (22)	11 (20)	8 (15)	0.1
Peripheral vascular disease, n (%)	0	0	0	0	0.1
Stroke, n (%)	0	0	0	0	0.1
Anemia, n (%)	0	0	0	0	0.1
Liver disease, n (%)	0	0	0	0	0.1
Other, n (%)	0	0	0	0	0.1
No other medical conditions, n (%)	27 (53)	26 (56)	28 (50)	16 (29)	<.0001

**Table 1B. Clinical and laboratory characteristics of surgical patients with myocardial infarction at time of intervention**

Variable	Prevalence of MI (%)	Prevalence in patients with MI (%)	Prevalence in patients without MI (%)	P value
Age at time of surgery, years (median [range])	55 (23-82)	55 (24-83)	55 (24-83)	0.1
Male, n (%)	53 (52)	51 (50)	57 (50)	<.0001
Other medical conditions				
Hypertension, n (%)	55 (53)	55 (53)	55 (48)	<.0001
Diabetes, n (%)	17 (17)	17 (17)	17 (15)	<.0001
Chronic kidney disease, n (%)	1 (1)	1 (1)	1 (1)	0.1
Coronary artery disease, n (%)	55 (53)	55 (53)	55 (48)	<.0001
Congestive heart failure, n (%)	10 (10)	10 (10)	10 (9)	0.1
Peripheral vascular disease, n (%)	0	0	0	0.1
Stroke, n (%)	0	0	0	0.1
Anemia, n (%)	0	0	0	0.1
Liver disease, n (%)	0	0	0	0.1
Other, n (%)	0	0	0	0.1
No other medical conditions, n (%)	45 (43)	45 (43)	45 (39)	<.0001

**Table 2. Univariate and multivariable analysis of risk factors for 90-day postoperative mortality**

Variable	Univariate OR (95% CI)	Multivariable OR (95% CI)
Age at surgery, years	1.01 (1.00-1.02)	1.01 (1.00-1.02)
Male sex	1.05 (0.98-1.13)	1.05 (0.98-1.13)
Preoperative MI	2.15 (1.85-2.50)	2.15 (1.85-2.50)
Preoperative heart failure	1.15 (1.05-1.26)	1.15 (1.05-1.26)
Preoperative hypertension	1.10 (1.00-1.21)	1.10 (1.00-1.21)
Preoperative diabetes	1.05 (0.95-1.16)	1.05 (0.95-1.16)
Preoperative CKD	1.05 (0.95-1.16)	1.05 (0.95-1.16)
Preoperative anemia	1.05 (0.95-1.16)	1.05 (0.95-1.16)
Preoperative liver disease	1.05 (0.95-1.16)	1.05 (0.95-1.16)
Preoperative other conditions	1.05 (0.95-1.16)	1.05 (0.95-1.16)
Preoperative no other conditions	1.05 (0.95-1.16)	1.05 (0.95-1.16)
Preoperative MI	2.15 (1.85-2.50)	2.15 (1.85-2.50)
Preoperative heart failure	1.15 (1.05-1.26)	1.15 (1.05-1.26)
Preoperative hypertension	1.10 (1.00-1.21)	1.10 (1.00-1.21)
Preoperative diabetes	1.05 (0.95-1.16)	1.05 (0.95-1.16)
Preoperative CKD	1.05 (0.95-1.16)	1.05 (0.95-1.16)
Preoperative anemia	1.05 (0.95-1.16)	1.05 (0.95-1.16)
Preoperative liver disease	1.05 (0.95-1.16)	1.05 (0.95-1.16)
Preoperative other conditions	1.05 (0.95-1.16)	1.05 (0.95-1.16)
Preoperative no other conditions	1.05 (0.95-1.16)	1.05 (0.95-1.16)

Figure 1

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