Predictive value of von Willebrand factor activity on two-year mortality

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Background

Von Willebrand Factor (vWF) activity and Ristocetin activity increases significantly after noncardiac surgery, which might be one explanation for the high incidence of postoperative thromboembolic events.[1] More importantly, thromboembolic events are serious complications and are associated with morbitity and mortality.[2] vWF is released in response to endothelial damage, mediating platelet adhesion and aggregation leading to hypercoagulablility.[3]
Interestingly, the role of preoperative vWF and Ristocetin activity as an early predictive marker for long-term mortality remains unknown. Thus, we evaluated the predictive value of preoperative vWF and Ristocetin activity on two-year mortality in patients with cardiac risk factors undergoing major abdominal surgery.

Methods

This is a post-hoc analysis of a randomized clinical trial, in which we randomized 258 patients with cardiac comorbidities undergoing major abdominal surgery to receive 80% versus 30% intraoperative oxygen. We showed previously that oxygen did not affect vWF activity, therefore all patients were included in this analysis. vWF and Ristocetin activity were measured shortly before induction of anesthesia. Vital status of all patients was obtained two years after surgery. We performed a receiver operator characteristics analysis (ROC) to determine the predictive value of vWF activity and Ristocetin on two-year mortality

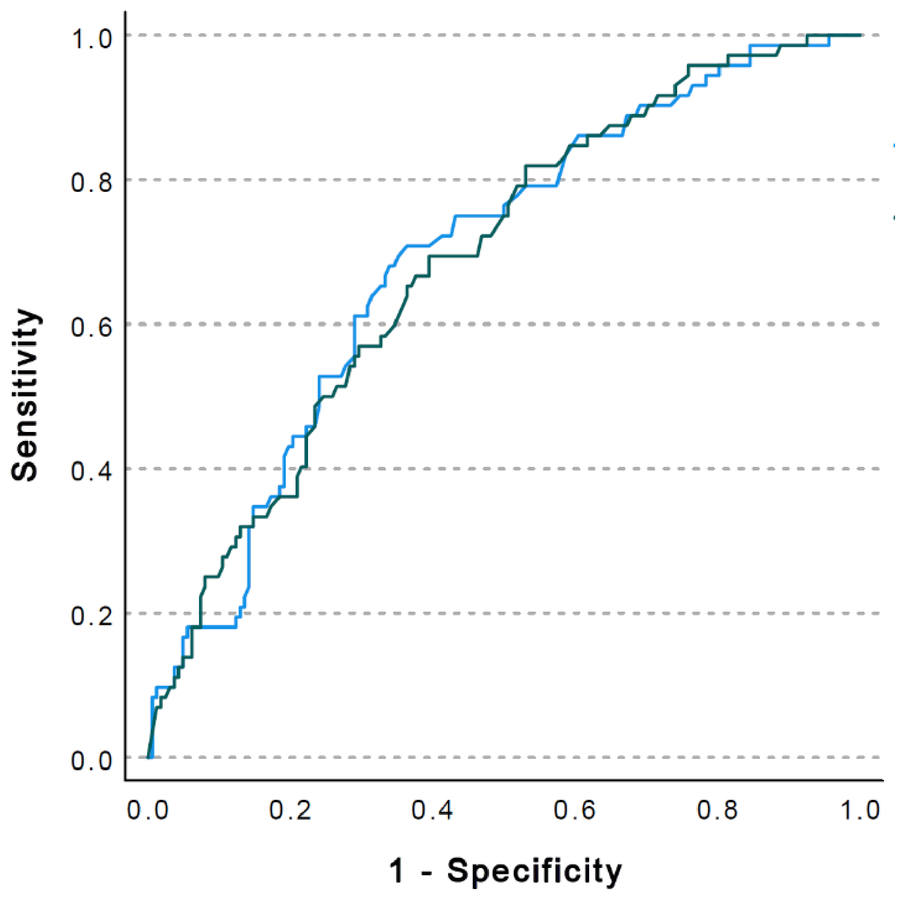

Figure 1: Receiver operator characteristics (ROC) curve for preoperative vWF (blue) and Ristocetin (green) activity and two- year-mortality

	FiO_2=0.80 (n=87)	FiO_2=0.30 (n=91)
Age, *years*	73 [46;88]	72 [51;88]
Weight, *kg*	81.4 ±17.7	80.3 ±15.7
Height, *cm*	171 ±8	174 ±8
Sex, *no. (%)*		
Female	35 (40)	24 (26)
Male	52 (60)	67 (74)
ASA, *no. (%)*		
II	25 (29)	35 (38)
III	60 (69)	56 (62)
IV	2 (2)	0 (0)
Cardiac comorbidities, *no. (%)*		
Coronary artery disease	20 (23)	21 (23)
Periphery artery disease	15 (17)	13 (14)
Stroke	9 (10)	8 (9)
Congestive heart failure	7 (8)	6 (7)
Transient ischemic attack	2 (2)	7 (8)
Arterial hypertension	80 (92)	82 (90)
Medication, *no. (%)*		
Beta-Blocker	40 (46)	44 (48)
ACE/AT1 Inhibitors	47 (54)	48 (53)
Diuretics	31 (36)	22 (24)
Statin	37 (43)	39 (43)
Platelet aggregation inhibitors	14 (16)	20 (22)
Anticoagulant	31 (36)	26 (29)
Insulin/oral antidiabetic drug	26 (30)	24 (26)

Table 1. Summary statistics are presented as counts of patients, means ±SD, and median [range]. ASA, American Society of Anesthesiologists physical status; ACE, angiotensin converting enzyme; AT1, angiotensin 1.

Results

The overall two-year mortality was 31.4%. The area under the ROC curve for preoperative vWF activity and two-year mortality in our patient population was 0,685 (95% CI: 0.614 – 0.757, p-value < 0.001) (Figure 1). The area under the ROC curve for preoperative Ristocetin activity and two-year mortality was 0,691 (95% CI: 0.619 – 0.762, p-value < 0.001) (Figure 1).

Conclusion

We showed that preoperative vWF activity and Ristocetin activity is very predictive for two-year mortality in patients with cardiac risk factors undergoing major abdominal surgery. Based on our results, it seems very likely that patients with preoperative signs of hypercoagulability have a higher risk to die within two years after surgery.

References

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