Usefulness of QB stress test in vascular access surveillance. Results of 18 months of follow-up on a hemodialysis unit
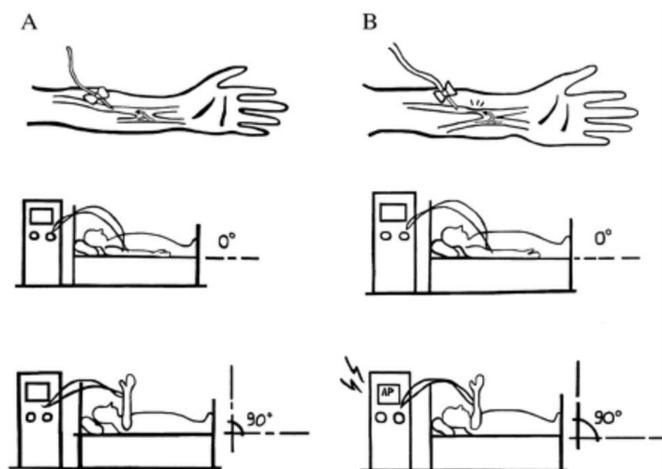
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Introduction: Preventing thrombosis is the main objective of a vascular access (VA) surveillance program. Early detection of stenosis should be one of the pillars of the strategy. The QB stress test (QBst) was developed with the objective of early identification of VA stenosis but its usefulness remains controversial.

What is the QBst?

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The test must be executed during the first haemodialysis hour:

1. Set the blood pressure alarm to - 250 mmHg
2. Set the venous pressure alarm to + 250 mmHg
3. Set Qb (pump speed) to 400 ml / min if possible
4. With patient at 0º raise the access member to 90º (Stress)
5. Wait for 30 seconds and check if the arterial alarm
6. The test will be considered positive if the alarm activates in this period
7. Repeat with Qb 300, 200 and 100 ml / min
8. If positive, record the number of times:
• Only at 400 -> 1+
• 400 and 300 -> 2+
• 400, 300 and 200 -> 3+
• 400, 300, 200 and 100 -> 4+

A QBST positive at a QB of 100–200 ml/min (low flow) is considered an increased risk of stenosis.

Methods: Prospective study with QBst evaluation every fortnight between June 2017 and November 2018 in all patients with an arteriovenous fistula (AVF). Data regarding demographic, biometric, VA consultations, diagnosis of stenosis, angioplasty, thrombosis and loss of VA was collected. All patients had at least a quarterly assessment of access flow QA with an ultrasound dilution technique. Suspected malfunctioning AVFs were referred for further imaging techniques (Doppler ultrasonography and angiography) and eventual percutaneous angioplasty (PTA) or surgical revision.

Results:

QBST	Negative	Positive
n	84	87
Sex (male %)	66.7	53.6
Age	70.2	68.0
Distal fistula (%)	26.2	77.0*
$\bar{x}$ accessflow (Qa:ml/min)	1269 ± 692	892 ± 333**
Stenosis (n / %)	7 / 8.3	10 / 11.4
Thrombosis (n / %)	6 / 7.1	6 / 8.0

**171 patients, 60.2% of males and an average age 69.0 ± 12.5**

5442 QBst were performed

QBst was positive (3 or 4+) with higher frequency in distal fistulas (*p*<0.001)* and we found a negative correlation between higher levels of QBst and QA (*r*= -0.35, *p*<0.001) **

The diagnosis of a significant stenosis with the need of PTA was performed in 17 patients (9.9%) and 6 of these (35.3%) had an inflow stenosis.

Twelve patients (7.0%) had an episode of thrombosis and of these, 50% had a positive QBst (*AUC*=0.437, *p*=0.432)

A positive QBst did not increase the risk of stenosis (OR 1.41, 95 CI:0.51–3.89, *p*=0.50), or thrombosis (OR 0.96, 95% CI:0.32–2.87, *p*=0.94)
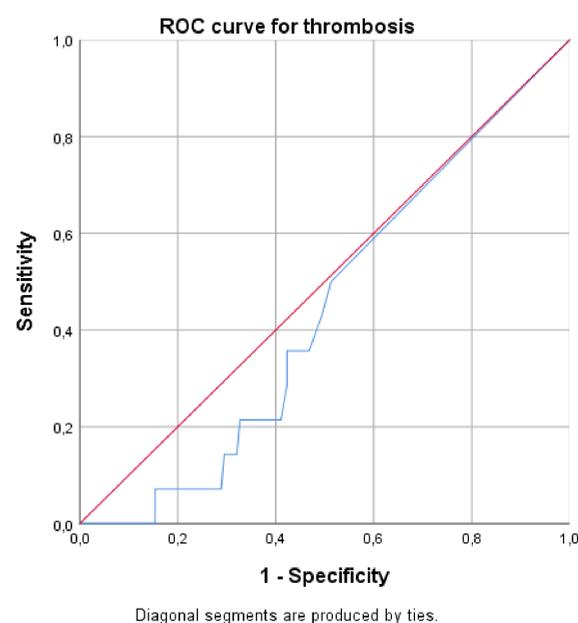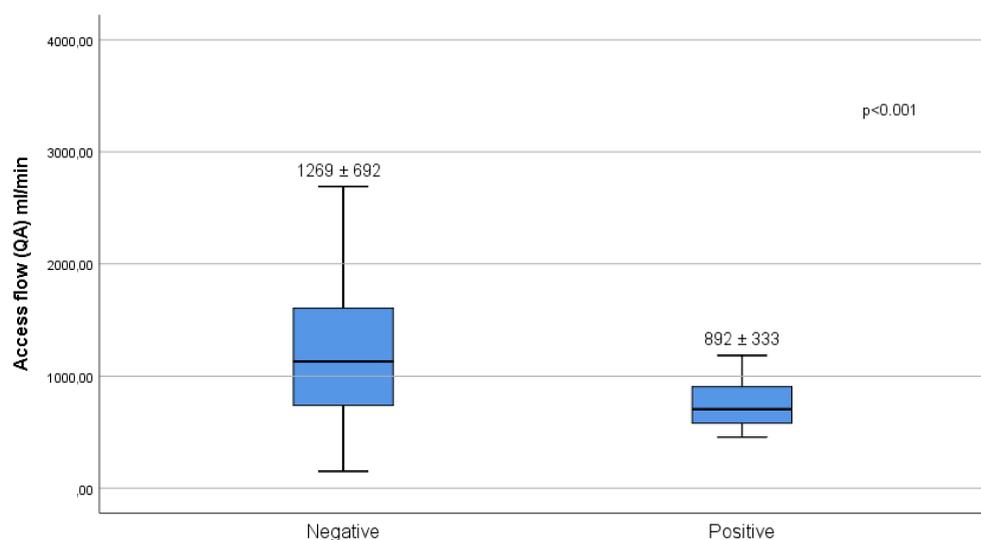
Conclusions: QBst correlates with accesses flow but this doesn't appear to predict an outcome. Despite posing a tool for the diagnose of an inflow stenosis, these are not always significant neither their existence alone increases risk of thrombosis of the VA.

References: Bonforte G, Pogliani D, Brenna S et. al. Validation of QB stress test as a useful tool in the detection of native arteriovenous fistula stenosis: results after 22 months of follow-up. Nephrol Dial Transplant. 2010 Jun;25(6):1943-9