

Reduced antithrombin-III-activity in patients with early thrombus formation after Fontan-operation

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Introduction:

There is a major risk for thrombus formation (TF) inside the extracardiac conduit and both pulmonary arteries after Fontan-operation. It may configure in the early postoperative period, despite anticoagulation with heparin. Disorders of the coagulation system are possible promotive factors.

Methods:

In a retrospective study we analysed the AT-III-a before and after Fontan-operation in n=29 consecutive patients without and n=6 with early postoperative TF.

Results:

The preoperative AT-III-a was normal ($100\% \pm 11.4\%$) without differences among both groups ($p=0.16$). Immediately after operation AT-III-a decreased slightly ($77\% \pm 10\%$), again with no significant difference between the two groups ($p=0.54$).

Six to eight hours after the operation we observed a major decline of AT-III-activity ($56.2\% \pm 10.9\%$) in patients with TF inside, while it fell only marginally in patients without TF ($74.3 \pm 11\%$). The difference between both groups was significant ($p=0.014$).

There was also a difference in AT-III-a among patients with and without TF in the morning of the 1st ($62.2 \pm 12.7\%$ vs. $71.2 \pm 14.9\%$) and 2nd ($50.5 \pm 14.3\%$ vs. $64.0 \pm 10.4\%$) postoperative day, but the dissimilarity was not significant.

In all patients with TF we could not reach a therapeutical aPTT during the first postoperative day, despite high doses of heparin.

Conclusions:

AT-III-a is reduced in some patients early after the Fontan-operation. This plays an important role in the pathogenesis of early postoperative TF inside the conduit or central pulmonary arteries.

Thus, AT-III-a has to be controlled and if necessary substituted, to attain a sufficient early postoperative anticoagulation.

Because argatroban is inhibiting thrombin directly and – in contrast to heparin - independent from AT-III-a, it may be an alternative to AT-III substitution.