2017

All patients admitted for neurosurgical intervention between 2012 and 2016 were stratified in low-, moderate- and high-risk of VT, and received a combination of ES and LMWH. The protocol was modified in 2014 with the inclusion of peri-operative IPC devices for all patients and, only in the high risk group, also postoperatively.

At time of post-hoc analysis data obtained from patients included in this study before 2014 (Protocol A, 3169 patients) were compared to those obtained after the introduction of IPC (Protocol B, 3818 patients). Among patients assigned to protocol A, 73 (2.3%) developed deep vein thrombosis (DVT) and 28 (0.9%) developed pulmonary embolism (PE), 9 of which fatal (0,3%). Among patients assigned to protocol B, 32 developed DVT (0.8%) and 7 (0.18%) developed PE, with 2 eventually resulting in the death of the patient. A post-hoc analysis confirmed that the use of preoperative LMWH was not associated with a statistically significant higher risk of postoperative bleeding.

This study, despite its limitations of the non-randomized design, seems to suggest that perioperative IPC devices are a non-negligible support in the prophylaxis of clinically symptomatic DVT and PE [1)].

2015

A retrospective analysis of 207 neurosurgical patients using intraoperative MRI was performed. A group of 86 patients was treated with the additional use of intraoperative and postoperative pneumatic compression until mobilization out of bed. One hundred twenty-one patients were treated without the use of additional pneumatic compression. Postoperatively the patients were screened for deep venous thrombosis by ultrasound and pulmonary embolism by CT-scan if suspicious. Statistical analysis was performed.

The development of deep venous thrombosis was reduced from 9.9% to 3.5% in our patients with the additional use of intraoperative and postoperative pneumatic compression. That is a 64.6% relative risk reduction to develop deep venous thrombosis with the use of intraoperative and postoperative pneumatic compression. An additional 52% relative risk reduction was found for the chance of developing pulmonary embolism. In the 15 patients with detected deep venous thrombosis, the OR-time was more than 100 min longer than in the 192 patients without detected deep venous thrombosis. The difference between both groups was significant.

This study demonstrates the benefit of pneumatic compression with a risk reduction for the development of thromboembolic complications. OR-time is another risk factor that attributes to a significant risk for the development of thromboembolic complications [2)].

2014

In total, 34 patients (68 limbs) undergoing knee and spine operations were prospectively randomized into two device groups:

alternate sequential compression device [ASCD] vs. a simultaneous sequential compression device [SSCD]).

Duplex ultrasonography examinations were performed on the 4th and 7th postoperative days for the

detection of DVT and the evaluation of venous hemodynamics. Continuous data for the two groups were analyzed using a two-tailed, unpaired t-test. Relative frequencies of unpaired samples were compared using Fisher exact test. Mixed effects models that might be viewed as ANCOVA models were also considered.

DVT developed in 7 patients (20.6%), all of whom were asymptomatic for isolated calf DVTs. Two of these patients were from the ASCD group (11.8%) and the other five were from the SSCD group (29.4%), but there was no significant difference ($p = 0.331$). Baseline peak velocity, mean velocity, peak volume flow, and total volume flow were enhanced significantly in both device groups ($p < 0.001$). However, the degrees of flow and velocity enhancement did not differ significantly between the groups. The accumulated expelled volumes for an hour were in favor of the ASCD group.

Both graded sequential compression devices showed similar results both in clinical and physiological efficacies. Further studies are required to investigate the optimal intermittent pneumatic compression method for enhanced hemodynamic efficacy and better thromboprophylaxis [3].

1)
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2)
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3)
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