Safety and Feasibility Of Ultrasound Accelerated Catheter Directed Thrombolysis And The Postthrombotic Syndrome

Valorization

Relevance and economic impact of the scientific results

This thesis shows there is a large group of patients who experience complaints after standard treatment for DVT. Most physicians are unaware of the long-term complications of DVT, and most physicians are unaware how many patients are affected by PTS. Patients who have PTS are often told, that there are no treatment options, and they should coop with their complaints. This thesis sheds a light on the possibilities of PTS prevention and the magnitude of the problem. Physicians are also unaware of the possibility UACDT for the treatment of DVT. The most heard comment why not to use UACDT is the risk of intracranial hemorrhage. In this thesis we hope to provide more up to date information on the bleeding risk with UACDT in DVT patients. Hopefully this thesis will put bleeding risk in a new perspective so physicians will more likely consider UACDT.

As mentioned earlier in this thesis, PTS is associated with high healthcare costs. Especially severe PTS causes the highest medical costs. If PTS can successfully be prevented by UACDT it will eventually reduce costs for society, as severe PTS is also associated with many lost workdays.

Groups of interest outside the medical field

Internists, radiologist, vascular surgeons, general practitioners and dermatologists are targeted in this thesis. Pharmaceutical companies can find new information on how to target their therapies. There is a great potential in optimizing treatment for DVT patients. Current devices are directly adapted from the treatment of arterial diseases. This thesis shows a potential area for future developments and also shows how many patients could be eligible for additional treatments. This big potential could awaken the commercial industry to dedicate research funds towards venous diseases and develop dedicated venous devices as is also discussed in chapter eleven.

Activities and implementation as result of this thesis

The LET classification is a novel tool, which can be used to identify patients with a high risk for developing severe PTS. The classification has to be evaluated prospectively in other to become useful in daily clinical practice. When using the LET-classification, the physician will have to be aware of the exact location of the thrombus. Duplex ultrasound and/or MR-venography can provide the clinician with this information. MR-venography is used in all DVT patients, and we believe it should be considered in all DVT patients with an iliofemoral (LET3/4) DVT. To show the possible advantages of MR-venography compared

to duplex ultrasound, there is currently a study comparing those two modalities with the golden standard invasive venography. The results are currently analyzed and hopefully published in the near future.

Another novelty was used in the analysis of the LET classification. The modified version of the villalta scale made it possible for the patients to fill out the score on their own. Previously scored villalta scores depended on the physician to provide information on the clinical signs on the leg of the patient. With the addition of a visual guide, the patient was able to score the clinical signs themselves. This will simplify future evaluations of PTS in large group of patients, and does not necessitate a visit to the hospital.

Innovative ideas and activities as result of this thesis

The chapters on UACDT add to the already existing knowledge, that UACDT is a technique for thrombus removal in the acute phase of DVT. In the Netherlands there is still great reluctance to treat patients with UACDT for DVT. This resulted in low number of patients being referred for the randomized controlled trial currently conducted in the Netherlands.

The modified version of the Villalta scale used in chapter four is new and could potentially make follow-up of large patient groups easier. The modified version had been used previously by Wik et al. and we further adapted the score to be more reliable. The original score necessitates that the physician examines the leg of the patient in order to come to a score. With the modified version the leg examination is done by the patients or his partner. This reduces the need for a hospital visit, reduces traveling costs and saves time of the physician, while retaining reliable results.

Treatment of stent problems have not been described in literature before, this is the first report ever on the topic. Previous reports by Raju, Neglen, Titus and de Wolf, describe the use of stents in the venous system. Beakgaard, Enden and our own experience show stent placement is sometimes necessary after DVT. Stent problems are reported, however a treatment option for these complications is never reported. In this thesis there is a first dedicated paper on these problems and we encourage other centers to also share their experience with the world.

Planning and realization of future activities as result of this thesis

Results of randomized controlled trials are still needed to provide us with conclusive answer in the subject of PTS prevention with UACDT. The CAVA-trial already started in 2010 and is still enrolling patients at the moment of writing.

Results of the trial are expected in 2017/2018. Depending on the outcome of this trial in combination with the Attract-trial and CaVenT-study, the trial will probably be succeeded by another randomized trial comparing different thrombus removal techniques. These trials will likely start in 2017 or 2018.

During the UACDT treatment, we encountered many stenotic leasions in the venous tract, and especially in the common iliac vein. Research on the best treatment options for these kinds of lesions will be necessary to ensure optimal patient care. Different stents and approaches should be compared to see which is the best.