

The Importance of Deep Vein Thrombosis Prophylaxis in Patients Undergoing Plastic Surgery

Plastic surgery is any surgical procedure that deals with the reconstruction or improvement of a body part to enhance the shape and appearance. The word “plastic” derives from the Greek *plastikos* meaning to mould or to shape; the term in this context is not connected with modern plastics¹.

A wide variety of procedures come under the umbrella of ‘plastic surgery’ and include both cosmetic and reconstructive procedures. Duration of surgery will vary enormously with some complex operations lasting many hours.

Venous thromboembolism

Venous thromboembolism (VTE) is a complex vascular disease with a multifactorial pathogenesis that results in two major clinical manifestations². The first and more common is deep vein thrombosis (DVT), which develops in the deep veins of the calf, thigh and pelvis. The second and more serious condition is pulmonary embolism (PE) which results if part or all the thrombus in the limb breaks off and enters the pulmonary arterial circulation, occluding blood flow in the lungs. Patients undergoing surgical procedures are at risk from developing VTE; this risk is affected by the nature and length of the procedure, type of anaesthesia, dehydration and sepsis³. Patients at highest risk of VTE are those undergoing lower limb arthroplasty, major trauma, spinal cord injury or a person undergoing surgery who exhibits multiple risk factors⁴. A significant number of plastic surgery patients may fit into this latter category.

What is the magnitude of the problem?

VTE is a well known risk of surgery. Within the plastic surgery speciality, abdominoplasty has a high rate of VTE which is thought to be related to interference of superficial venous drainage from the pelvis and legs⁵. Grazer and de Jong (2000)⁶ report a cohort of more than 496,000 liposuction patients where pulmonary embolus was identified as the largest single cause of mortality. A survey of 273 plastic surgeons performing face lift operations on 9,937 patients identified that VTE events were a measurable complication with 35

patients (0.35%) developing DVT and 14 patients (0.14%) developing PE⁷. This same study demonstrated that 83.7% of the face-lift patients who developed VTE complications had received a general anaesthesia whereas only 16.3% of the VTE cases occurred when local anaesthesia and sedation were used.

Why is the plastic surgery patient at risk of VTE?

Venous stasis

Administration of a general anaesthetic causes a loss of normal physiological muscle contraction in the lower limbs⁸ and also results in distension of the deep veins of the leg decreasing venous return⁹. Plastic and reconstructive surgery procedures may last several hours; for example, the average time for face lift procedures was identified by Reinische et al (2001)⁷ as being 4½ hours. Post-operatively patients will also be relatively immobile spending long periods of time in bed or sitting.

Alteration in fibrinolytic activity

Vessel damage and trauma during the operative procedure lead to enhanced release of procoagulants. It has long been established that major surgery is accompanied by a recognised reduction in the spontaneous fibrinolytic activity of the blood, a so-called ‘fibrinolytic shutdown’^{10,11,12,13,14}. This phenomenon is reported to commence during or soon after the surgical procedure and last for at least 3 days^{10,13}.

Prevention of VTE in plastic surgery patients

The occurrence of post-operative bleeding in plastic surgery procedures may lead to poor cosmetic results or the need for further cosmetic intervention; thus the plastic surgeon is forced to walk a thin line with bleeding complications on one side and VTE risk on the other¹⁵.

A recent systematic review¹⁶ has highlighted how mechanical methods of VTE prophylaxis as a monotherapy reduce the risk of DVT in surgical patients by approximately two thirds and patients can expect to derive benefit from using this type of prophylaxis irrespective of their risk level.

In a survey of 273 plastic surgeons in the USA, Reinische et al (2001)⁷ identified how most did not utilise any VTE prophylaxis when undertaking face lift procedures. Where intermittent pneumatic compression (IPC) devices were used, there was a significant reduction in thromboembolic complications.

The American Society of Plastic Surgeons have established guidelines¹⁷ for VTE prophylaxis in plastic surgery patients and recommend that patients should be stratified into categories according to individual risk. IPC devices are recommended as solo prophylaxis in both moderate and high-risk groups and in combination with low molecular weight heparin in the highest risk patients¹⁸. This trend is also being reflected in the UK where in a survey of British and Irish plastic surgeons, 86% used a set VTE prophylaxis protocol, 68% used FLOWTRON® DVT prophylaxis (or similar) and 79% used multi-modality regimens¹⁹.

“Compared with the other options, intermittent pneumatic compression stockings have the combined advantage of being a very effective reducer of venous thromboembolism without causing an increased risk of bleeding¹⁸.”

Duration of prophylaxis

IPC prophylaxis should be commenced intraoperatively as DVT often develops as a result of the surgical procedure. Evidence based guidelines and consensus papers^{3,4} also stress the requirement for prophylaxis to continue until the patient is fully ambulatory.

Increasingly, initial VTE events are occurring after hospital discharge since length of stay in hospital has decreased in many countries⁴, highlighting the requirement for on-going prophylactic measures.

Mechanical and biochemical effects of FLOWTRON DVT Prophylaxis Systems

Prevention of venous stasis

The *FLOWTRON* DVT Prophylaxis System prevents venous stasis by active augmentation of blood flow^{20,21,22,23,24,25,26}. This reduces stasis, flushes valve pockets where thrombi originate, decreases venous hypertension and decreases interstitial oedema²⁷.

Increases fibrinolytic activity

Use of *FLOWTRON* DVT Prophylactic Systems results in an increase in the fibrinolytic activity of the blood^{28,29}, suppression of procoagulant factors^{28,29} and may assist in the reversal or prevention of fibrinolytic shutdown.

Clinical studies using the FLOWTRON DVT Prophylaxis Systems

Clinical studies undertaken in surgical patients utilising *FLOWTRON* DVT prophylaxis have established high levels of efficacy combined with excellent patient concordance and freedom from adverse affects^{8,30,31,32,33,34}. An additional benefit is that when *FLOWTRON* DVT Systems were used as the method of prophylaxis and compared to low molecular weight heparin (LMWH), the operative field was drier and easier to work in^{31,33,35}. Comparative studies^{36,37} have demonstrated that *FLOWTRON* DVT Prophylaxis Systems are as effective as LMWH in preventing DVT and PE. There was significantly lower cost and no side effects associated with use of the *FLOWTRON* Systems.

Conclusion

Plastic surgery patients present a challenge with regard to VTE prophylaxis. Although the risks of VTE are real, there is a reluctance to use chemical prophylaxis methods due to bleeding concerns¹⁸.

Use of *FLOWTRON* DVT prophylaxis provides a safe and effective method of VTE prophylaxis whilst minimising the risk of potentially harmful side effects.

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