PREOPERATIVE RISK ASSESSMENT FOR THROMBOEMBOLISM

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Abstract

There is nothing more distressing in cosmetic surgery than having a patient developing thromboembolism and dying after an elective surgery. Patients should be evaluated for risk factors for thromboembolism before surgery and measures taken to prevent thromboembolism. The various risks for thromboembolism are discussed and the means to prevent or avoid thromboembolism are discussed. One of the most common errors in cosmetic surgery that increase the risk of thromboembolism is the failure to have the patient stop estrogens at least four weeks before surgery and two weeks after surgery.

Introduction

There is nothing more distressing in cosmetic surgery than having a patient develop thromboembolism and dying after an elective surgery. One of the commonest problems is the failure to require the patient having cosmetic surgery to cease estrogens at least four weeks before and two weeks after surgery. There is enough evidence to show that estrogens, whether for birth control or for replacement therapy, are a serious risk for thromboembolism.[1-3] There are other factors that increase the risk of thromboembolism and surgeons should be aware of these.

Patients should be evaluated for risk factors for thromboembolism before surgery and measures taken to prevent thromboembolism.

Clinical Manifestations of Thromboembolism

Superficial thrombophlebitis (an inflamed vein) appears as a red, tender cord. Deep-vein thrombosis may be associated with pain at rest or only during exercise with edema distal to the obstructed vein. The first manifestation can be pulmonary embolism. There may be tenderness in the extremity and the temperature of the skin may be increased. Increased resistance or pain on voluntary dorsiflexion of the foot (Homan's sign) and/or tenderness of the calf on palpation is useful diagnostic criteria.

Pulmonary embolism is usually manifested by one of three clinical patterns. 1) onset of sudden dyspnea with tachypnea and no other symptoms; 2) sudden pleuritic chest pain and dyspnea associated with findings of pleural effusion or lung consolidation; and 3) sudden apprehension, chest discomfort, and dyspnea with findings of cor pulmonale and systemic hypotension. The symptoms occasionally consist of fever,

arrhythmias, or refractory congestive heart failure. This author had one patient who complained of about five minutes of dyspnea during the night following breast lift and pulmonary embolism was diagnosed.

Diagnosis of Thromboembolism

Deep-vein thrombosis can be diagnosed with duplex ultrasonography that combines pulsed gated Doppler evaluation of blood flow with real-time ultrasound imaging. Other diagnostic tests include x-ray venography, radionucleide venography, radioisotope-labeled fibrinogen, ultrasonography, and impedance plethysmography. Liquid crystal thermography detects increases in skin temperature and is a useful adjunct to ultrasonography or impedance plethysmography.

The definitive diagnosis of pulmonary embolism can be made by pulmonary arteriography. Ventilation-perfusion (VP scan) lung scan is a safe, fairly sensitive means of diagnosing pulmonary embolism. Isotope pulmonary perfusion scan (Q scan) is more specific with inclusion of the isotope ventilation scan (V scan). Arterial blood gas typically shows reduction in Pa_{02} and $Pa_{CO2,}$[4] neither of which is diagnostic since this may occur with other disorders. Electrocardiogram will show tachycardia but is best used for ruling out myocardial infarction. Chest x-ray may show basilar atelectasis, infiltrates, pleural effusion, or cardiac dilatation.

Prophylactic Measures

Hospitals have been evaluating patients before surgery for thromboembolic risks using Risk Assessment Forms for rating risk factors (Table 1) and deciding on the

prophylactic measures necessary (Table 2). Outpatient Surgery Centers and Office Surgical Suites should be doing the same.

Obese patients should be warned that obesity increases the risk of thromboembolism and should be encouraged to lose weight before elective surgery.

Estrogens, both oral contraceptive and hormonal replacement therapy, are known causes of thromboembolism.[5] Patients on estrogens should be advised about the increased risk of thromboembolism if the estrogens are not stopped at least four weeks before surgery and two weeks after surgery. If the patient refuses to stop the estrogens, whatever the reason, the surgeon must decide as to whether or not to do the cosmetic procedure. A written statement that the patient refuses to stop estrogens and the reasons for the refusal, should be entered into the medical records.

Physicians Desk Reference

The Physicians Desk Reference (PDR) states that for Ortho Evra (Norelgestromin/Ethinyl Estadiol Transdermal System)[6] and Ortho Tri-Cyclen Tablets and Ortho-Cyclen Tablets (Norgestimate/Ethinyl Estradiol)[7] "an increased risk of thromboembolism and thrombotic disease associated with hormonal contraceptives is well established" and that "If feasible, hormonal contraceptives should be discontinued at least four weeks before and two weeks after elective surgery of a type associated with an increase in risk of thromboembolism and during and following prolonged immobilization." Under Premarin[8] (conjugated estrogen tablets) in the PDR, it is stated that with "…estrogen-alone…the risk of VTE [*venous thromboembolism*] (DVT [*deep venous thrombosis*] and pulmonary embolism (PE), was reported to be increased for women taking conjugated estrogens..." and that "if feasible, estrogens should be

discontinued at least 4 to 6 weeks before surgery of the type associated with an increased risk of thromboembolism, or during periods of prolonged immobilization."

Rosendaal (2005)[5] stated that immobilization is a known factor for causing thromboembolism as well as prolonged travel in airplanes, deficiencies in protein C and proteins, and heritable thrombophilia.

Sandler and Martin (1989)[9] noted that there was a 10% incidence of thromboembolism in 2,388 autopsies as a cause of death in the general hospital population. The incidence of thromboembolism following liposuction is about 1%,[10] abdominoplasty is 1.5-2%,[11,12] and the combination of liposuction and abdominoplasty have an incidence of 2.9%.[13]

All patients having cosmetic surgery over 45 minutes should have graduated compression stockings (anti-embolism stockings) or intermittent compression stockings (sequential compressive device) during and after surgery until ambulatory as a routine measure to prevent thromboembolism. The sequential compressive device has fibrolytic effects[14] and reduces the risk of thromboembolism by 60%.[15] The pneumatic compression device is much better than anti-embolism stockings and probably should supplant its use.

The use of the venous foot pump is for the prevention, treatment, and management of venous disease in the lower extremities.[16] Charalambous et al[17] concluded that the venous foot pump had questionable efficiency in deep venous thrombosis prophylaxis in the context of a true clinical setting.

The use of low molecular weight heparin (Lovenox, enoxeparin) should be considered in patients with moderate risk for thromboembolism and used in all patients with high risk for thromboembolism.[18-20]

Conclusions

Patients should be assessed preoperatively for elective cosmetic surgery as to the risks of thromboembolism and preventive measures to be taken.

Attention should be paid to the specific risk of the use of estrogens before and after surgery. This includes birth control pills and replacement estrogen therapy. Estrogens should be stopped at least four weeks before and two weeks after surgery.

Patients having surgery should have some type of compression garments during surgery. Intermittent compression devices are better than anti-embolism stockings. These garments should be used until the patient is ambulatory after surgery. Lovenox should be considered for those patients who have moderate risk for thromboembolism and used in all patients with a high risk of thromboembolism.

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TABLES

Table 1

Rate	Risk Factor
1	Minor surgery (under 45 minutes)
1	Age between 41-60 years
1	History of prior major surgery (less than one month)
1	Varicose veins
1	Inflammatory bowel disease
1	Swollen legs (current)
1	Obesity
1	Oral contraceptive or hormone replacement therapy
1	Pregnancy or post partum (under one month)
2	Age between 61 to 74 years
2	Malignancy present or within the past six months
2	Major surgery (over 45 minutes)
2	Laparoscopic surgery (over 45 minutes)
2	Confinement to bed (more than 72 hours preoperative and postoperative)
2	Immobilizing cast (less than one month)
2	Central venous access (less than one month)
3	History of deep venous thrombosis (DVT) or pulmonary embolism (PE)

3	Family history of thrombosis
3	Age 75 years or older
3	Major surgery with additional risk factors (myocardial infarction, congestive heart failure, sepsis, chronic obstructive pulmonary disease
3	History of increased clotting time
3	Stroke (less than one month)
3	Multiple trauma (less than one month)

Table 2

Total Points	Risk Level	Prophylactic Measures
0-2	Low	Early ambulation
		Anti-embolism stockings
		Sequential compression device
3-4	Moderate	Early ambulation
		Anti-embolism stockings
		Sequential compression device
		May use Lovenox 40 mg subcutaneously every day or 30 mg subcutaneously every 12 hours
Over 4	High	Anti-embolism stockings
		Sequential compression device
		Use Lovenox 40 mg subcutaneously every day or 30 mg subcutaneously every 12 hours

Lovenox (enoxaparin) is low molecular weight heparin. Should stop aspirin (salicylates) dipyridamole, non steroidal anti-inflammatory drugs (NSAIDS), or sulfinpyrazone. Has a low risk of causing bleeding (1-2% in the perioperative period). Do not use if the patient is allergic to heparin or pork products or has a low platelet count or bleeding tendency.