CASE REPORT

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Venous thromboembolism after shoulder arthroplasty: a report of three cases

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Venous thromboembolism after shoulder arthroplasty is considered a rare phenomenon, but can be a dangerous and life-threatening condition. We report three cases of venous thromboembolism sustained after shoulder arthroplasty. One of the patients had a non-fatal pulmonary embolism. The other two had deep vein thrombosis, one in the operated upper extremity, and the other in a lower extremity. The cases are described in detail and discussed to reveal the possible contributing risk factors. The purpose of this case series is to increase awareness of this relatively rare, but potentially serious complication.

Keywords: Arthroplasty; thromboembolism; shoulder.

Venous thromboembolism (VTE) is a major cause of preventable mortality and morbidity, and is associated with significant economic burden.[1-3] VTE is a recognized complication of hip and knee arthroplasty and has been increasingly observed and reported in patients who have had a shoulder arthroplasty (SA). However, the exact incidence of VTE after SA is not known. The incidence ranged from 0.2% to 16% in a recent systematic review, but was calculated in another review to be 0.52%.[4,5] Contrary to hip and knee arthroplasty, evidence-based guidelines on VTE prophylaxis for SA do not exist, with the majority of SA patients not receiving any prophylaxis at all.[4,5]

We identified three patients who had VTE following elective SA between 2009 and 2011. We provide a report of this relatively rare, but potentially serious complication. The report aimed to raise awareness of this complication and to stimulate discussion, encouraging researchers to conduct high level studies on thromboprophylaxis efficacy and safety for SA patients. Each patient was informed that data concerning the case would be submitted for publication, and agreed to this.

Case report

Case 1– A 64-year-old Caucasian male patient underwent an elective total shoulder arthroplasty (TSA) of his severely arthritic right shoulder. His body mass index (BMI) was 36 and he was on medication for dyslipidemia. This patient was known to have Factor V Leiden deficiency.[6] He reported a history of spontaneous trav-

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el-related left leg deep vein thrombosis (DVT) and pulmonary embolism (PE) seven years prior to this admission and he had been taking daily ASA 81 mg since this event. His surgical history included cholecystectomy, left knee arthroscopy, bilateral knee arthroplasty, left shoulder hemi-arthroplasty, and left hand arthrodesis with no VTE complications. His blood investigations were normal on admission. Preoperatively, the internist did not recommend DVT prophylaxis.

Surgery was performed under general anesthesia with the patient in beach chair position. No pharmacological thromboprophylaxis was used perioperatively. A cemented TSA was performed using the anterior deltopectoral approach. Total operative time was 158 minutes and blood transfusion was not needed.

On the first postoperative day, physiotherapy was initiated as per our protocol for TSA. The second postoperative day was uneventful, and the patient was discharged home on the third postoperative day.

Eight weeks postoperatively, a DVT in the operated upper extremity was diagnosed by ultrasound. The patient was treated as an out-patient with daily subcutaneous Enoxaparin 1.5 mg/Kg for 7 days and continued on Warfarin 6 mg/day for 6 months. Thirteen weeks postoperatively he had mild arm swelling which responded well to the use of an elastic compression sleeve. The DVT did not progress to PE and he experienced a good recovery.

Case 2– A 68-year-old Caucasian female patient had been suffering from left shoulder rotator cuff arthropathy, and underwent a reverse shoulder arthroplasty (RSA). Her BMI was 24 and she was known to have a VACTERL syndrome[7] which manifested as multiple anomalies, including scoliosis and anal atresia. This patient had also survived a thyroid carcinoma at the age of 34, for which a total thyroidectomy was performed. Thyroxin was being used regularly afterwards. Her surgical history was extensive and included a total of 48 procedures, but was significant for primary and revision arthroplasties of the right hip and right knee, hysterectomy, bilateral shoulder tendon repairs and multiple abdominal surgeries that culminated in a permanent colostomy. Other comorbidities included poorly-controlled hypertension, dyslipidemia, osteoporosis and a mild bleeding tendency. Her preoperative investigations were normal except for a right bundle branch block on her ECG and a blood pressure of 140/90 mmHg.

The operation was performed under general anesthesia with the patient in beach chair position. No pharmacological thromboprophylaxis was used perioperatively.

Table 1. Common risk factors for venous thromboembolism (VTE).

Age >60 years
Obesity (BMI >30 Kg/m^2)
Thrombophilia
Personal or family history of VTE
Immobility (paralysis, wheel chair bound)
Continuous travel for >3 hours up to 4 weeks before or after surgery
Recent pelvis or long bone fracture
Emergency major orthopaedic surgery
Use of oral contraceptives or hormone replacement therapy
Pregnancy and puerperium
One or more significant medical comorbidities
- heart disease
- metabolic, endocrine, respiratory pathologies
- acute infectious disease
- inflammatory conditions
Critical care admission
Active cancer or cancer treatment
Varicose veins with phlebitis

Table 2. Common bleeding risk factors.

Inherited bleeding disorders (haemophilia or von Willibrand disease)
History of recent stroke
Thrombocytopenia (platelets <75 X 10^9/L)
Uncontrolled systolic hypertension
Anticoagulant use (INR >2)
Liver failure

An uncemented RSA was performed using the anterior deltopectoral approach. Total operative time was 139 minutes. Physiotherapy was initiated on the first postoperative day as per protocol, and she was discharged home the next day.

Three weeks postoperatively, she was diagnosed with a right leg DVT. She was treated with subcutaneous Fragmin followed by 2 mg of Warfarin daily for 6 months. Anticoagulant therapy resulted in a hematoma in her right hip, a complication that necessitated percutaneous needle aspiration. She recovered well from the DVT and from the iatrogenic complication.

Case 3– A 61-year-old Caucasian male patient was admitted for elective SA of his arthritic right shoulder. His BMI was 36.5, and he smoked one pack of cigarettes a day. The patient was known to have obstructive sleep apnea, gastro-esophageal reflux disease, anxiety and a history of rheumatic fever in childhood. He was also hypertensive but not on medications. His surgical history included left knee arthroscopy, hernia repair, tonsillectomy, bilateral knee arthroplasty, vasectomy, and nasal septoplasty. His

left knee arthroplasty two years earlier was complicated by DVT and PE despite the prophylactic use of Factor Xa inhibitor. As a result, he received Warfarin for the next 3 months. His preoperative investigations were normal, but his blood pressure was 165/105 mmHg.

Surgery was performed under general anesthesia with the patient in beach chair position. A subcutaneous injection of 5000 units of Fragmin was administered intraoperatively, and bilateral TED stockings were used during surgery, which lasted 142 minutes. Using the anterior deltopectoral approach, a glenoplasty and uncemented shoulder hemiarthroplasty was performed.

Postoperatively, the patient desaturated, even with oxygen supplement. Physiotherapy was withheld until the second postoperative day. Computed tomography (CT) of the chest confirmed the finding of extensive bilateral PE. The medical team postulated that PE may have been present prior to surgery since the patient's preoperative oxygen saturation was 94%. The source of the embolized thrombi was never recognized. Anticoagulant therapy was initiated, with Enoxeparin for five days and 10 mg of Warfarin for three months. The patient recovered well from the PE and was discharged home on the tenth postoperative day.

Discussion

The published data varies significantly in terms of incidence of VTE after SA.[4,5] Although generally considered to be a rare event, a recent prospective trial suggests that the incidence of DVT after SA is 16% and is comparable to that after hip arthroplasty.[8] The decision to use prophylaxis for SA continues to be according to surgeon preference. In a recent clinical practice guideline (CPG), the American Academy of Orthopaedic Surgeons (AAOS) recommended the use of perioperative mechanical and/or chemical VTE prophylaxis for SA patients.[9] Pharmacological prophylaxis, however, is not without bleeding risk.[9,10] The CPG recommended that the embolic risk must be weighed against the potential bleeding risk. In the United Kingdom, the National Institute of Clinical Excellence (NICE) recommends that SA patients who are at increased risk of developing VTE should be offered mechanical prophylaxis on admission and pharmacological prophylaxis started 6-12 hours postoperatively.[10] Similarly, the British Elbow and Shoulder Society has recently published a draft of recommendations with respect to VTE prevention.[11] Pharmacological prophylaxis was recommended in SA patients who are at high or extremely high risk of developing VTE. Once indicated, the pharmacological prophylaxis should be continued for a month. Those who are at low or medium risk should be provided with mechanical prophylaxis.

Retrospectively, we recognize all our three patients as high-risk for VTE (Table 1).[10,11] As was done with the third patient, prophylaxis should have been considered in the first two patients as well. They were all above 60 years of age and undergoing a major orthopaedic procedure, factors which contributed to their status as high-risk. The first patient had several additional risk factors, including obesity, thrombophilia, and a history of VTE. Although he was taking ASA 81mg, this is now considered an insufficient method of prophylaxis.[1,10,12] The second patient had multiple comorbid diseases. She also reported a tendency to bruise easily, a condition that was not investigated and may be linked to a platelet dysfunction.

The third patient was recognized preoperatively as a high-risk for VTE. In addition to his age, he was obese, hypertensive and had a history of smoking and postoperative DVT and PE despite the use of thromboprophylaxis. This time, despite our use of both mechanical and pharmacological prophylaxis, the patient still developed a PE. We assume that he had a pre-existing DVT that started to embolize preoperatively, and this would explain the failure of chemical prophylaxis. Manipulating the patient on the operating table may have dislodged additional thrombi from a lower extremity vein. The patient's unexplained low preoperative oxygen saturation and high blood pressure should have also been managed prior to surgery.

We suggest that VTE risk status be specifically assessed and stratified in all patients undergoing SA. In those considered for pharmacological prophylaxis, the risk of bleeding should also be assessed (Table 2).[10] VTE needs to be mentioned in the informed consent as a possible complication, with high risk patients being counselled on the benefits of pharmacological thromboprophylaxis, as well as the possibility of bleeding.

Conflicts of Interest: No conflicts declared.

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