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Venous thromboembolism after radical cystectomy: Experience with screening ultrasonography

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KEYWORDS

Deep vein thrombosis;
Pulmonary embolism;
Radical cystectomy;
Ultrasonography;
Venous thromboembolism

ABBREVIATIONS

BMI, body mass index;
DVT, deep vein thrombosis;
EBL, estimated blood loss;
LMWH, low-molecular weight

Abstract ***Objectives:*** To detect the incidence of immediate postoperative deep vein thrombosis (DVT) using screening lower extremity ultrasonography (US) in patients undergoing radical cystectomy (RC) and to determine the rate of symptomatic pulmonary embolism (PE) after RC and identify risk factors for venous thromboembolic (VTE) events in a RC population.

Patients and methods: We performed a retrospective review of prospective data collected on patients who underwent RC between July 2008 and January 2012. These patients underwent screening US at 2/3 days after RC to determine the rate of asymptomatic DVT. A chart review was completed to identify those who had a symptomatic PE. Univariate and multivariable analysis was used to identify risk factors associated with DVT, PE and total VTE events.

Results: In all, 221 patients underwent RC and asymptomatic DVT was identified in 21 (9.5%) on screening US. Nine (4.5%) developed symptomatic PE at a median of 9 days, of which no patients had positive lower extremity US postoperatively. Increased length of hospital stay, increased estimated blood loss, and lower body

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heparin;
LOS, length of hospital stay;
PE, pulmonary embolism;
RC, radical cystectomy;
US, ultrasonography;
VTE, venous thromboembolism

mass index were linked to risk of PE, and only a previous history of DVT was associated with postoperative DVT.

Conclusion: Patients who undergo RC are at high-risk for thromboembolic events and multimodal prophylaxis should be administered. Clinicians should be especially vigilant in those who demonstrate factors associated with higher risk for VTE events.

Introduction

In the USA, >70,000 men and women are diagnosed with bladder cancer annually and it is associated with ≈15,000 deaths [1]. The 'gold standard' for muscle-invasive and locally advanced disease is radical cystectomy (RC) with pelvic lymph node dissection [2]. Furthermore, patients with other malignancies, such as colorectal masses and gynaecological cancers, may require RC as part of their surgical plan. Unfortunately, extirpation of the bladder and creation of a urinary diversion are not without consequence, as reported 90-day complication rates range from 49% to 64% [3–5]. Mortality rates are also significant ranging from 1.5% to 6.9% [3–6].

One of the most devastating consequences of RC is venous thromboembolism (VTE), which can account for up to 22% of total deaths after surgery [5,7]. In the bladder cancer literature, symptomatic thromboembolic events occur in up to 8.3% of patients [3–6,8], but subclinical deep vein thrombosis (DVT) rates can be as high as 24.4% when examining an ultrasonography (US)-screened population [9]. In fact, undergoing a RC is a significant, independent risk factor on multivariable analysis for developing a DVT [9].

Clearly, VTE is a significant burden for patients after RC. Several studies have reported the rates of symptomatic VTE; however, few reports are available describing the 'true' incidence in a screened population. In the present study, our objective was to describe the rate of DVT in an US-screened population and to identify factors that portend increased risk. Furthermore, we determined the 90-day rate of symptomatic PE or any VTE and corresponding risk factors.

Patients and methods

After obtaining Institutional Review Board approval, we performed a retrospective review of prospectively collected data of patients who underwent RC with urinary diversion from July 2008 to January 2012. All RCs were performed by one of two fellowship-trained urological oncologists. Standard RC was performed with pelvic lymphadenectomy. The template for lymph node dissection at our institution includes the obturator, common, external, and internal iliac lymph node packets. All patients received routine postoperative care via a collaborative care pathway for RC. Patients were followed at 3-month intervals for the first and second year, and every 6 months, thereafter. The follow-up consisted of: history and physical examination, routine laboratory tests, and radiographic evaluation. Each patient was queried at their 3 month visit about any complications, hospitalisations or concerns postoperatively. Directed imaging was performed for clinical signs of VTE.

During the course of the study, all patients underwent lower extremity Doppler US at 2/3 days after RC. At our institution, a 5–8 MHz US probe is used to evaluate for vein compressibility from the groin to the ankle including but not limited to the common and superficial femoral veins, popliteal veins and posterior tibial and peroneal veins in the calf bilaterally. In our early study population (July 2008 to October 2010), VTE prophylaxis included perioperative sequential compression devices and early ambulation. Patients found to have DVT on US were started on therapeutic dosages of heparin or low-molecular weight heparin (LMWH) followed by long-term warfarin therapy. In the later study population (October 2010 to January 2012), all patients received perioperative chemoprophylaxis with heparin or LMWH, in addition to sequential compression devices and early ambulation. Chemoprophylaxis was discontinued when patients were discharged home. Patients diagnosed with DVT in this group were also started on therapeutic dosages of anticoagulation. All patients diagnosed with symptomatic PE within 90 days were identified and included in our analysis.

Rates of asymptomatic DVT on screening US, symptomatic PE, and incidence of total VTE were determined. Potential risk factors [age, body mass index (BMI), history of DVT, neoadjuvant chemotherapy, previous abdominal surgery, operating room time, estimated blood loss (EBL), blood transfusions, chemoprophylaxis, pathological stage, and length of hospital stay (LOS)] were analysed for their association with asymptomatic DVT, symptomatic PE, and total incidence of VTE. Univariate analysis was used with chi-square and Fisher's exact test for categorical data and the independent *t*-test for continuous variables. Multivariable analysis was performed using logistic regression analysis