Increasing CT Pulmonary Angiography Utilization Despite Declining VTE Rates Following Total Joint Arthroplasty

Introduction: Venous thromboembolism (VTE) is a serious complication following total joint arthroplasty (TJA). It remains unclear whether postoperative VTE rates have changed over time in contemporary practice. The purpose of this study was to evaluate temporal trends in VTE rates and diagnostic imaging utilization following TJA.

Methods: A large national all-payer database was queried to identify patients undergoing primary TJA between 2010 and 2022. Annual rates of deep vein thrombosis (DVT) and pulmonary embolism (PE) within 90 days of surgery were calculated per 1,000 procedures. Rates of lower-extremity duplex ultrasound and computed tomography pulmonary angiography (CT-PE) utilization were similarly calculated. Linear regression analyses were performed to evaluate temporal trends over the study period.

Results: A total of 2,315,684 TJA procedures were included in our analysis. Between 2010 and 2022, rates of postoperative DVT decreased from 30.7 to 16.7 per 1,000 procedures ($p<0.001$), while PE decreased from 8.7 to 6.3 per 1,000 procedures ($p<0.001$). During the same period, utilization of lower-extremity duplex ultrasound declined from 118.8 to 72.9 per 1,000 procedures ($p<0.001$). In contrast, CT-PE utilization increased from 12.1 to 17.0 per 1,000 procedures ($p<0.001$).

Conclusion: Advances in perioperative protocols have dramatically reduced the incidence of venous thromboembolism following total joint arthroplasty. DVT rates declined in a linear fashion over time, reaching 1.67% in 2022. Similarly, PE rates decreased over the study period, with rates of 0.63% in 2022. Despite declining VTE rates, CT-PE utilization increased over time, suggesting that diagnostic imaging practices for suspected postoperative VTE may be evolving independently of thromboembolic event rates following TJA.

Figure 1: DVT Rate (/1000 TJAs)

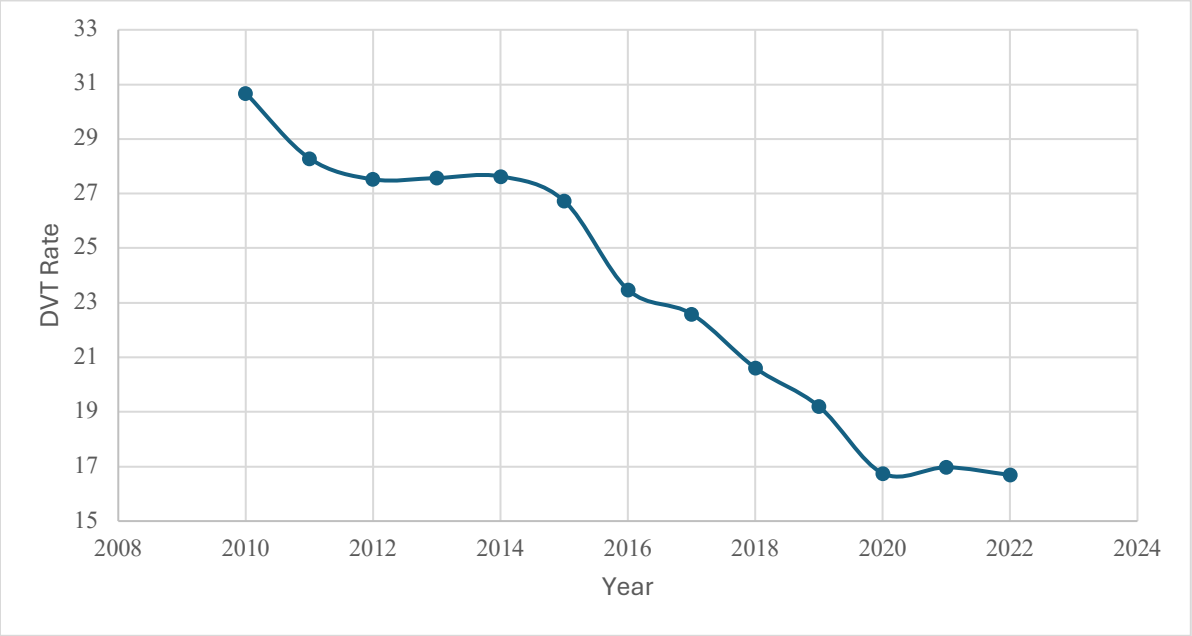

Figure 2: CT-PE Rate (/1000)