Arthroplasty Today 4 (2018) 475–478

Contents lists available at ScienceDirect

Arthroplasty Today

journal homepage: http://www.arthroplastytoday.org/

Original research

Aspirin: are patients actually taking it?—A quality assessment study

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ARTICLE INFO

Article history:
Received 20 April 2018
Received in revised form
19 July 2018
Accepted 20 July 2018
Available online 3 September 2018

Keywords:
Aspirin
DVT prophylaxis adherence
Primary total joint arthroplasty
DVT
Patient education

ABSTRACT

Background: The purpose of the study was to assess patient adherence to an aspirin-based prophylactic deep venous thromboembolism (DVT) care management plan after total lower extremity arthroplasty.
Methods: Using a cross-sectional study design, patients who underwent total hip or knee replacement surgery by a single senior surgeon were surveyed at their routine 6-week follow-up appointment regarding adherence to aspirin DVT prophylaxis. Postoperatively, patients were advised to take 325 mg of aspirin twice daily for 6 weeks to prevent DVT.
Results: Of the 101 patients surveyed, 45 underwent total hip arthroplasty while 56 underwent total knee arthroplasty. There were 48 (48%) patients who were still taking aspirin at their routine 6-week postoperative follow-up appointment and 53 (52%) patients who were not taking aspirin (nonadherent group). Of the latter, 3 (6%) never took aspirin postoperatively, 14 (26%) discontinued within 2 weeks postoperatively, and 23 (43%) did not take it any longer for half the time prescribed. In the nonadherent group, 8 patients reported that they felt they did not need the aspirin prophylaxis, 5 experienced side effects, and 10 were unsure of how long they needed to take it. There was 1 patient with a calf DVT and no episodes of pulmonary embolism.
Conclusions: Over half of our study, patients did not finish their aspirin regimen. We suggest a consistent outline of medication duration throughout the pre/postop course and communication regarding aspirin cessation.

Introduction

It is well known that patients undergoing major orthopaedic surgeries are at significant risk of developing a venous thromboembolism (VTE). Incidence of VTE ranges from 40% to 85% without chemoprophylaxis in elective total hip arthroplasty (THA) and total knee arthroplasty (TKA) [1,2]. However, the initiation of multimodal postoperative thromboprophylaxis protocols has decreased the incidence of nonfatal and fatal pulmonary embolisms (PEs) after THA to 1.2% and 0.4%, respectively [2]. In the TKA population, the incidence of a fatal PE has dropped to approximately 0.1% [3]. Despite the documented success of thromboprophylaxis, there is still no consensus on the ideal pharmacologic agent to use for VTE prophylaxis.

With multiple chemoprophylactic agents available and the lack of consensus in the orthopaedic literature, it is difficult for orthopaedic surgeons to determine the best option for their patients. In 2009, the American Academy of Orthopedic Surgeons provided some guidance when they endorsed aspirin for VTE prophylaxis after total joint arthroplasty (TJA) [4]. Soon thereafter, the American College of Chest Physicians provided a grade IB recommendation for the use of aspirin in low-risk or standard-risk patients undergoing TJAs [5]. In addition to these recommendations, multiple studies have documented aspirin to be as or more effective than other agents used in VTE prophylaxis [6-12]. The safety of aspirin in patients recently undergoing TJAs has also been documented with only a low risk of adverse bleeding events, making aspirin both a safe and effective medication for VTE prophylaxis [3,4].

One or more of the authors of this paper have disclosed potential or pertinent conflicts of interest, which may include receipt of payment, either direct or indirect, institutional support, or association with an entity in the biomedical field which may be perceived to have potential conflict of interest with this work. For full disclosure statements refer to https://doi.org/10.1016/j.artd.2018.07.006.

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https://doi.org/10.1016/j.artd.2018.07.006

As such, aspirin continues to gain popularity for use in outpatient VTE prevention. However, adherence to any medication regimen can be problematic when medications are prescribed for patients to take multiple times per day for a prolonged period of time. Wilke et al. [13] observed a range of 13%-21% of nonadherence by patients prescribed low-molecular-weight heparin for VTE prevention following major orthopaedic surgery. In another study by Wilke et al. [14], current THA and TKA patients and past thromboprophylaxis patients were surveyed about their adherence. All the patients enrolled agreed that low-molecular-weight heparin injections were inconvenient due to the need for subcutaneous injections and would prefer oral medication for VTE prevention. Aspirin is not only an oral agent, it has the added benefit of not requiring outpatient laboratory monitoring when taken for VTE prophylaxis. Aspirin dosing is typically 81 mg or 325 mg taken once or twice daily, similar to dosing for warfarin. Yet, despite the simplicity, safety profile, and low cost of an aspirin regimen, there is concern of nonadherence among patients. The low cost and over-the-counter availability may lead many patients to underestimate the importance of the medication and perceive adherence as nonessential. To our knowledge, there is no literature investigating the details of patient adherence to aspirin thromboprophylaxis after TJA.

The purpose of this study was to determine the rate and details of adherence to an aspirin-based VTE prevention regimen of patients after THA and TKA.

Material and methods

This was a quality assessment study of consecutive patients undergoing a TJA by a single surgeon. In this study, patients were surveyed to assess VTE prophylaxis adherence during the 6 weeks after a TJA. Consent from patients to participate in this study was not required because this was an observational quality assessment study. As such, it contained no identified data and had no impact on patient care or outcomes. Patients over 18 years of age who underwent a primary THA or TKA and were prescribed aspirin were eligible for this study. High-risk patients for deep venous thrombosis (DVT), such as prior DVT/PE or known coagulopathy, were treated with Lovenox, Coumadin, or Fondaparinux and were not eligible for this study. Also, patients already on anticoagulant regimens were not prescribed aspirin and resumed their regimen postoperatively. After surgery, 2- and 6-week follow-up appointments were routinely scheduled for all patients. At the 6-week follow-up appointment, patients were asked to complete an anonymous, unannounced, voluntary questionnaire to assess their adherence to the VTE prophylaxis (aspirin) regimen. The questionnaire was given at this visit because it was the end period for aspirin prophylaxis.

Patient education, including the details and purpose of the aspirin regimen, started before surgery. Patients received DVT prophylaxis education at the preoperative joint class, which all patients attended. Importance of anticoagulation and risk of DVT were reemphasized at the preoperative visit. All patients were instructed to take a 325 mg aspirin, 2 times a day, for a total of 6 weeks. The purpose, importance, and duration of this regimen was again reiterated to the patient on postoperative day 1 and was also provided as a hard copy, which was included with the discharge instructions.

Throughout the postoperative hospital stay, all patients utilized sequential compression devices as well as in-patient physical therapy (PT). PT started on postoperative day 0 and continued throughout the length of stay. After discharge from the hospital, patients were referred to outpatient PT or home PT with the goal of transitioning to outpatient PT. Duration of PT was variable and depended on patient preference and progress with goals.

Six weeks after surgery, patients were surveyed regarding duration of adherence, side effects, and DVT/VTE incidence. Reasons for nonadherence and partial adherence, as well as questions addressing confusion of the prescribed course and perceived necessity of the regimen, were included on the questionnaire.

Table 1
Respondent characteristics (n = 101).

Age (y)[a]	67.9 ± 9.1
Gender	
Male	32/98 (32.7%)
Female	66/98 (67.4%)
Procedure	
Hip replacement	45/101 (44.6%)
Knee replacement	56/101 (55.5%)

[a] n = 96; value is expressed as mean ± standard deviation.

Results

A total of 101 patients completed the questionnaire. All patients completed the questionnaire, and there were no refusals. Table 1 shows the characteristics of the respondents. Just over half of the patients underwent TKA (55.4%), while the others underwent THA (44.6%).

Only 48% (48/101) of the patients were still taking their aspirin in the prescribed manner at their 6-week follow-up appointment. The remaining 52% partially adhered to the regimen or did not adhere to the regimen at all. The duration of adherence among patients who partially adhered to the protocol varied across this group (Fig. 1). Approximately 54% (26/48) of these patients did not take their aspirin for half of the prescribed duration. In addition, 3 of these respondents never even started the regimen.

Reasons for not adhering or partially adhering varied among the nonadherent group. Approximately 15% (8/53) of these patients felt that they did not need to take the aspirin for the duration of the 6-week postoperative period and 19% (10/53) claimed uncertainty of how long to take the medication. Only 55% (29/53) of the nonadherent patients provided specific reasons why they did not follow the aspirin regimen. Of those that provided specific reasons, 31% (9/29) claimed that another provider instructed them to either stop taking the aspirin early, lowered the dose, or suggested stopping the regimen altogether. Other providers included physicians, nurses, and pharmacists. One patient discontinued the regimen because she was not experiencing any pain.

Approximately, 9% (5/53) of the nonadherent patients experienced side effects from the regimen. One patient developed acute renal failure, one experienced gastrointestinal (GI) upset, and another patient encountered recurrent nose bleeds. One patient in the nonadherent group developed a calf DVT, but this did not propagate into a VTE.

Discussion

Our 101 surveyed respondents revealed a nonadherence rate of 52% with VTE prophylaxis after a primary TJA. Many factors contribute to patient adherence to medications including convenience, cost, dosing regimen, side effects, and patient education. In comparison to traditional VTE prophylaxis regimens that may require frequent injections and laboratory monitoring, aspirin is administered orally and may be preferred by some patients [15]. The cost of aspirin is also less than other traditional VTE prophylaxis agents such as warfarin, dabigatran, and rivaroxaban.

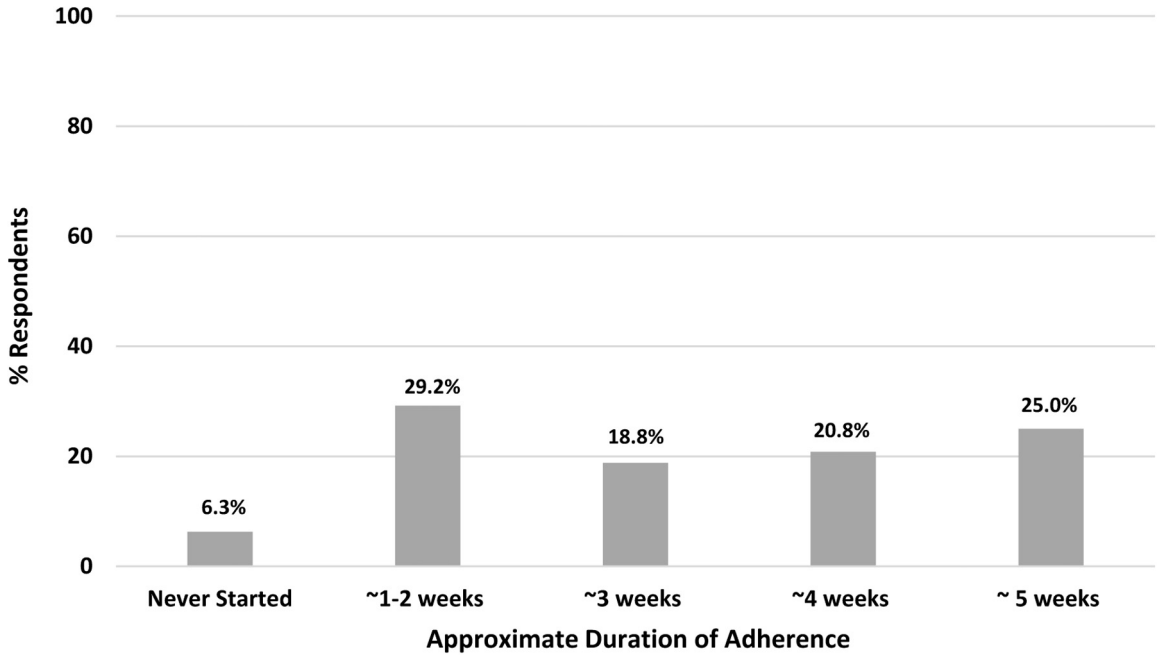

Figure 1. Duration of adherence for nonadherent respondents.

The dosing regimen of the medication is another factor affecting adherence. Our study's protocol required the patient to take 325 mg of aspirin 2 times daily. It has been shown that increasing the daily dose of a medication will decrease the overall adherence. Claxton et al. [16] reported 79% adherence with a once-daily dose compared to 69% adherence with a twice-daily dose. While not a significant difference, this was still a decrease overall. A third and fourth dose per day decreased adherence further to 65% and 51%, respectively. Other studies reported greater than 90% adherence to VTE prophylaxis after a THA, using a once-daily dosing regimen [15,17].

Decreasing our current dosing regimen, one which is endorsed by the American Academy of Orthopedic Surgeons and American College of Chest Physicians, from 2 times daily to one time daily may be helpful in increasing patient adherence. Once-daily aspirin dosing has been shown to decrease thromboembolic events after surgery [9,18]. A study from the Pulmonary Embolism Prevention Trial Collaboration Group showed that low-dose aspirin (160 mg) taken once daily decreased VTE after hip fracture surgery and elective knee and hip surgeries [9].

Approximately 9% of the respondents in this study attributed their poor adherence to side effects from the regimen, which included acute renal failure, GI upset, and recurrent nose bleeds. Decreasing the dose of aspirin from 325 mg to a low-dose aspirin, such as 81 mg, could potentially help in decreasing unwanted side effects and improve patient adherence to the VTE prophylaxis regimen. A study by Parvizi et al. [19] showed a decrease in VTEs in a study group taking low-dose aspirin (81 mg) twice daily compared with another group taking high-dose aspirin (325 mg) twice daily. Also noted in this study was a decreased incidence of side effects in the low-dose aspirin group, including GI bleeding/ulcer, and periprosthetic joint infection.

Patient education also plays a role in adherence to medication regimens. A study by Brown and Bussell [20] identified several patient-related factors, such as a lack of understanding of their condition and poor health literacy, as well as several physician-related factors, such as poor explanation of medication benefits and adverse effects, that contributed to decreased medication adherence. Preoperatively, the details and purpose of our medication regimen was discussed with each patient. On the first postoperative day, patients were instructed on proper dosage, frequency, and duration of their VTE prophylaxis. These instructions were again detailed and provided as a hard copy with each patient's discharge paperwork. Even so, 19% of the nonadherent patients claimed uncertainty of how long to take the medication and 15% felt that they simply did not need to take the aspirin. Over a quarter of these patients (31%) claimed another health-care provider recommended they shorten, reduce the dose, or stop the aspirin altogether. Using a “teach-back” method, insuring other family members, or educating caregivers about the medication regimen may help address this miscommunication.

There were several limitations to this study. First, the cross-sectional nature of the study potentially predisposed the results to suffer from recall bias. Also, the data were collected using a questionnaire and may have been subject to response bias. Response bias was controlled for by the anonymity and voluntary nature of the questionnaire but may have still affected the patient's responses. Second, there was incomplete participation by patients surveyed, particularly in the nonadherent group. Just over half of the nonadherent patients offered specific reasons for not fully following the aspirin regimen. Owing to this lack of responses, a complete analysis of why patients were not adherent to their VTE prophylaxis regimen could not be fully assessed. One factor not investigated was perceived importance. Perhaps because aspirin is an over-the-counter medication, it is perceived as less important than a prescription medication or a more complex medication regimen such as Lovenox, which requires injections. Third, the survey responses were limited to a single physician's patients at one institution. Our results may not be generalizable to other institutions. Also, our sample size was relatively small and would benefit from a larger sample size to yield more robust data. A fourth limitation is that patient demographics and other assessment measures, such as psychosocial factors, were not analyzed. This would have been beneficial to identify possible subgroups that were at higher risk for nonadherence. Finally, the questionnaire that was used was not validated.

The nonadherence rate with VTE prophylaxis was greater than 50%. Following the results of our study, we have changed our protocol for post-TJA DVT prophylaxis to 81 mg of aspirin, 2 times per day, for 6 weeks. Further studies would be required to demonstrate efficacy of once-daily aspirin dosing as a possibility to further reduce side effects and improve adherence.

Further optimization of patient education (eg, teach back, communication with other providers) on the purpose of VTE prophylaxis and the proper dosing and frequency of their medication may also be effective to improve adherence.

Conclusions

In conclusion, it is important to understand that nonadherence with VTE prophylaxis after TJA is common and has the potential to affect patient outcomes. More importantly, future studies investigating the effectiveness of VTE prophylaxis and patient adherence with medication regimens are necessary to make meaningful conclusions. Although aspirin has been shown to be noninferior to other regimens, it is possible that the most important effect we are seeing leading to lower rates of VTE is a result of rapid rehabilitation protocols and early mobility because prolonged immobility is a risk factor for DVT. While beyond the scope of this study, investigating VTE rates, patient mobility timelines, and rehabilitation protocols would be worthwhile for future studies.

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