Determination of a safe INR for joint injections in patients taking warfarin

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ABSTRACT

INTRODUCTION With an increase in life expectancy in 'developed' countries, the number of elderly patients receiving joint injections for arthritis is increasing. There are legitimate concerns about an increased risk of thromboembolism if anticoagulation is stopped or reversed for such an injection. Despite being a common dilemma, the literature on this issue is scarce.

METHODS We undertook 2,084 joint injections of the knee and shoulder in 1,714 patients between August 2008 and December 2013. Within this cohort, we noted 41 patients who were taking warfarin and followed them immediately after joint injection in the clinic or radiology department, looking carefully for complications. Then, we sought clinical follow-up, correspondence, and imaging evidence for 4 weeks, looking for complications from these joint injections. We recorded International Normalised Ratio (INR) values before injection.

RESULTS No complications were associated with the procedure after any joint injection. The radiologists who undertook ultrasound-guided injections to shoulders re-scanned the joints looking for haemarthroses: they found none. A similar outcome was noted clinically after injections in the outpatient setting.

CONCLUSION With a mean INR of 2.77 (range, 1.7–5.5) and a maximum INR within this group of 5.5, joint injections to the shoulder and knee can be undertaken safely in primary or secondary care settings despite the patient taking warfarin.

KEYWORDS

Warfarin – International Normalised Ratio – Injection – Complications

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Use of anticoagulant drugs is more prevalent with age. Up to 6% of patients aged 80–84 years have been reported to be taking warfarin.¹ The most common indications for oral anticoagulation are atrial fibrillation, mechanical heart valves, and venous thromboembolism.

With an increase in life expectancy in 'developed' countries, the number of elderly patients receiving joint injection for arthritis is increasing. There are legitimate concerns about an increased risk of thromboembolism if anticoagulation is stopped or reversed for such an injection² and, despite being a common dilemma, the literature on this matter is scarce.^{3,4}

In addition, International Normalised Ratio (INR) ranges are different depending on indications. For example, most metallic valves require an INR = 3–4, but atrial fibrillation warrants INR = 2–3. Hence, there is considerable variation with regard to an acceptable INR for injection.

We assessed the risk of complications associated with joint injection in patients taking long term warfarin, and correlated them with the final INR value pre-injection. We also wished to provide a range of INR values within which joint injections could be deemed safe.

Methods

Patients undergoing knee and shoulder injections at Guy's and St. Thomas' Hospitals National Health Service Foundation Trust (London, UK) from August 2008 to December 2013 were identified from coding of injections in the outpatient setting. Between October 2010 and December 2013, we included ultrasound (US)-guided shoulder injections undertaken in the radiology department.

All injections were undertaken by orthopaedic surgeons in clinic or by trained interventional radiologists if injections were guided by imaging. Patients were reviewed for evidence of bleeding by clinical examination in the outpatient setting or by a second US scan ≈15min after the first scan. Our teaching hospital did not have a policy with respect to joint-injection procedures on patients receiving anticoagulation.

Standard methods were employed for injections. Procedures in the shoulder joint included lateral or posterior approaches to the subacromial space, as well as injections in the anterior or posterior glenohumeral joint. Superolateral or superomedial approaches were used for the knee.

Aseptic techniques were followed and local anaesthesia

employed for all procedures. The injection was administered using 19-G (often white in colour and 1.1 mm in diameter) or 21-G (green; 0.8 mm) needles. Triamcinolone or methyl-prednisolone (40–80mg) were used in shoulders and knees.

Clinicians undertook joint injections regardless of the INR value. The date and value of the last INR value before the injection was noted. Procedure-related complications were defined as significant bleeding, infection, or acute pain related to the injection. These complications could occur in the community or could have resulted in admission to hospital. Nevertheless, either situation was regarded to be within the complications arising from this procedure.

We reviewed follow-up clinic letters and hospital records looking for admissions or attendance to a primary-care physician or the emergency department of a hospital < 4 weeks from the injection. Radiology investigations ordered

<4 weeks of injections were also monitored to confirm possible complications as a result of the injection.

Results

A total of 2,084 joint injections (Fig 1) were carried out in 1,714 patients during the study period. Of these, 86 injections were administered to 41 patients on long term warfarin. The shoulder (1,142) was injected more commonly than the knee (942). Mean age of the study cohort (22 females and 19 males) was 71 years.

The most common indication for anticoagulation was atrial fibrillation (30 patients), followed by venous thromboembolism (9 patients). Two other patients had a metallic valve.

Mean INR was 2.77 ± 0.80 (range, 1.7–5.5). Also, 87% of patients had an INR ≥ 2 with a mean time of INR checking before injection of 15 ± 13 (range, 0–48) days. In addition, 52% of INR checks were made <2 weeks from the injection. The three highest INR values were >5 (Fig 2).

Figure 1 INR values and number of injections

Figure 2 Distribution of INR values in terms of time interval before injection

No complications were associated with the procedure after any joint injection. The radiologists who undertook US-guided injections to shoulders re-scanned the joints looking for haemarthroses: they found none. A similar outcome was noted clinically after injections in the outpatient setting.

Discussion

Joint injections and aspirations are common interventions, with many being carried out in primary care.⁵ Up to 6% of patients aged 80–84 years can be on long-term anticoagulation,⁴ a figure that is likely to increase as life expectancy increases and non-surgical interventions (eg defibrillators, pacemakers) become more common.

Thumboo and O'Duffy⁵ undertook a prospective analysis of 32 joint/soft-tissue aspirations or injections in 25 patients taking warfarin: median INR was 2.6. They documented no patient-reported complications of joint/soft-tissue haemorrhage, and concluded that this procedure was associated with a low risk of haemorrhage.

Salvati *et al.*⁴ conducted a prospective analysis of arthrocentesis in 15 patients on chronic warfarin therapy with an INR range 1.3–5.0. Two of these 15 patients had haemarthrosis with an INR of 3.8 and 5.0, respectively. They concluded that anticoagulation should not be an absolute contraindication to arthrocentesis.

Ahmed and colleagues published a study in 2012⁵ in which they conducted a retrospective review of 640 arthrocentesis and joint injections in 514 anticoagulated patients. A total of 456 procedures were carried out in patients with an INR of ≥ 2.0 , and 184 procedures were done in patients with an INR < 2.0 . One procedure resulted in early, clinically significant bleeding in the fully anticoagulated group. One procedure resulted in late joint infection, and three patients returned to hospital because of pain presumed to be related to the procedure (one of which was the patient with clinically significant bleeding). They concluded that arthrocentesis and joint injections in patients receiving chronic warfarin therapy with a therapeutic INR are safe procedures.

Studies have confirmed that other procedures, such as pacemaker insertion,⁶ coronary angiography⁷ or angioplasty⁸ are safe in patients on warfarin. Continuation of therapeutic warfarin has been advocated during local extraction procedures provided local measures are taken to stop bleeding.⁹ A recent prospective case-control study concluded that local haemostasis in dental implant surgery can prevent bleeding complications in patients on oral anticoagulants, thereby allowing these surgical procedures to be carried out in an outpatient setting.¹⁰ Indeed, recent studies have recommended continuation of therapeutic

doses of warfarin even during major procedures such as total knee replacement.^{11, 12}

However, all the available evidence is level IV, and there is a paucity of good-quality level-I evidence. There are few data and no randomised trials to determine acceptable INR ranges in patients on long-term warfarin anticoagulation undergoing joint injections. Hence, the present study adds valuable information to the evidence base.

Our study had limitations. This was a retrospective, observational study with no control group. Formal standardisation of the injection method was lacking, and the follow-up period varied. Most patients had the INR checked < 4 weeks of injection but INR checks after injection were variable.

Conclusions

No complications were associated with joint injections in patients with an INR ≤ 5.5 . Therefore, our practice is to continue warfarin to maintain a therapeutic INR, whatever the indication.

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