CIRUGÍA ESPAÑOLA

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Original article

Elective inguinal hernioplasty in patients on chronic anticoagulation therapy. Management and outcome

Ernest Bombuy,[a,] Esther Mans,[a] Alejandro Hugué,[a] Esther Plensa,[b] Lluís Rodriguez,[b] Miquel Prats,[a] and Xavier Suñol[a]*

[a]*Servicio de Cirugía General, Hospital de Mataró, Mataró, Barcelona, Spain*
[b]*Servicio de Hematología, Hospital de Mataró, Mataró, Barcelona, Spain*

ARTICLE INFO

Article history:
Received October 31, 2008
Accepted February 16, 2009
Online May 31, 2009

Keywords:
Inguinal hernioplasty
Chronic anticoagulation
Ambulatory surgery

A B S T R A C T

Background: Perioperative management of patients on anticoagulant therapy increases the complexity of elective inguinal hernia repair. We assessed the safety of our standardised anticoagulation protocol and investigated the outpatient and one day surgery rates.
Material and methods: The records of 1184 patients undergoing elective inguinal hernioplasty between 2005 and 2007 were reviewed; 14 patients on chronic anticoagulation therapy were identified. We used a standard bridging therapy protocol with low-molecular-weight heparins. Outcomes were assessed at 30 days post-procedure and included bleeding, thromboembolic events or death, and type of hospital admission.
Results: Mean age was 74 (10) years; 12 (25%) patients were high risk for thromboembolism and 31 (67%) patients were ASA III. Almost all inguinal repairs were performed using a polypropylene mesh; 6 (13%) patients had a surgical site haematoma and there was 1 (2.7%) major bleeding, that was re-operated on. No thromboembolic events or deaths occurred; 11 (23%) patients were treated on an outpatient basis and 16 (34%) on a 1 day surgery regimen. Mean hospital stay was 2.4 (5.1) days.
Conclusions: Elective inguinal hernioplasty in patients on chronic oral anticoagulation therapy using a standard bridging protocol is a safe procedure. Chronic anticoagulation therapy is not a contraindication for ambulatory surgery..

*Corresponding author.
E-mail address: 30622ebg@comb.es (E. Bombuy).

Palabras clave:
Hernioplastia inguinal
Anticoagulación oral
Cirugía mayor ambulatoria

Hernioplastia inguinal electiva en pacientes con anticoagulación oral. ¿Son candidatos a cirugía ambulatoria?

RESUMEN

Introducción: El tratamiento perioperatorio de los pacientes con anticoagulantes orales (ACO) incrementa la complejidad de la hernioplastia inguinal electiva.
Objetivo: Analizar la seguridad de nuestro protocolo de tratamiento en pacientes con ACO intervenidos de hernioplastia inguinal electiva y valorar el porcentaje de pacientes tratados mediante cirugía ambulatoria y cirugía de corta estancia.
Material y métodos: Se revisaron los datos administrativos de 1.184 pacientes intervenidos de hernioplastia inguinal en 2005–2007 y se identificó a 47 pacientes en tratamiento con ACO. Se utilizó, como tratamiento puente perioperatorio, un protocolo estandarizado con heparinas de bajo peso molecular (HBPM). Los resultados se analizaron hasta 30 días después del procedimiento e incluían las siguientes variables: hemorragia, episodios tromboembólicos o muerte y régimen hospitalario (cirugía mayor ambulatoria, corta estancia o ingreso convencional).
Resultados: La media de edad fue 74 ± 10 años; 12 (25%) pacientes tenían un alto riesgo tromboembólico y 31 (67%) pacientes tenían la categoría ASA III. La técnica quirúrgica de elección fue la hernioplastia sin tensión con mallas de polipropileno. En 6 (13%) pacientes se diagnosticó haematoma de la herida quirúrgica y 1 (2,1%) paciente sufrió una hemorragia mayor que precisó de reintervención. Ningún paciente tuvo episodios tromboembólicos y no hubo fallecimientos. A 11 (23%) pacientes se trató de forma ambulatoria y a 16 (34%), en régimen de cirugía de corta estancia. La media de estancia hospitalaria fue 2,4 ± 5,1 días.
Conclusiones: La hernioplastia inguinal electiva en pacientes con ACO, mediante una terapia puente con HBPM, es un procedimiento seguro. La anticoagulación oral no es una contraindicación absoluta para la cirugía ambulatoria

Introduction

The elective inguinal hernioplasty is a frequent, simple, and well-established surgical procedure that gives good results and a high outpatient rate. The development and implementation of outpatient surgery programs has allowed a progressive increase in the number of interventions to be carried out and health costs to be reduced while maintaining the quality of care. A total number of 17 883 patients were surgically intervened in Catalonia in 2006, which represents the third most frequent surgical procedure in public hospitals.[1]

Due to the progressive aging of the population, the candidates for inguinal hernioplasty are usually elderly patients, with a higher number of co-morbidities and therefore, it is not rare that these patients are treated with oral anticoagulants (OAC).[2] The peri-operative handling of these patients is a clinical problem that increases the general complexity of the procedure. Most of these patients need some type of bridging therapy (BT) to prevent the serious clinical consequences of a thromboembolic episode.[3-5] Normally, the OAC were substituted by intravenous heparin to prepare for the elective surgery. This procedure is complex and increases hospital stay and costs. Low-molecular-weight heparin (LMWH) started to be used as an alternative when handling patients whose anticoagulant state required modifications during short periods.[2-6] LMWH can be comfortably administered subcutaneously, in 1 or 2 daily doses adjusted to the patient's weight, without having to monitor the coagulation parameters or hospitalise the patient.

The safety of our protocol for the peri-operative handling of patients with OAC that have undergone an elective inguinal hernioplasty was analysed and the percentage of patients that had undergone said procedure in an outpatient regime or a short-stay surgery regime (<24 h) was investigated.

Material and methods

The administrative data of 1184 patients that had undergone an elective inguinal hernioplasty during the years of 2005-2007 were randomly reviewed. The 47 patients identified as being treated with OAC were included as the study population.

Peri-operative handling of oral anticoagulation

The patients received a standardised dose of anticoagulation according to that described in Table 1. LMWH was used as a bridging therapy. The patients and their caretakers were instructed on how to administer the subcutaneous heparin doses by demonstration, by the nursing personnel, during the previous visit in the haematology area or, alternatively,

Table 1 – Type of anticoagulation

Day	Activity
	Before surgery
–3	Suspension of oral anticoagulation
–2	Group 1: enoxaparin 1 mg/kg/12 h at 20:00
–2	Group 2: dalteparin 5000 U/24 h at 20:00
	Surgery
0	INR before surgery
0	Group 1: start enoxaparin 1 mg/kg 12 h after surgery
0	Group 2: start dalteparin 5000 U/12 h after surgery
	After surgery
+1	Group 1: enoxaparin 1 mg/kg/12 h
+1	Group 2: dalteparin 5000 U/24 h
+1	Start of oral anticoagulation
+4	Control of INR

INR indicates international normalised ratio.
Group 1: high risk patients; group 2: standard risk patients.

Table 2 – Demographic and evolution data

	Patients (n=47)
Age, mean (SD), y	74 (10)
Males, n (%)	41 (87)
Indication for anticoagulation, n (%)	
Atrial fibrillation	29 (62)
Mechanical valve	10 (21)
DVT/PE	4 (9)
High risk of thromboembolism, n (%)	12 (25)
ASA III, n (%)	31 (67)
INR	1.3 (0.4)
Surgical time, min	34 (8)
Haematoma of surgical wound, n (%)	6 (13)
Major haemorrhage, n (%)	1 (2,7)
Hospital stay, d	2.4 (5.1)
Ambulatory surgery, n (%)	11 (23)

The data presents the average (the standard deviation), except when indicated.
ASA indicates American Society of Anaesthesiologists; DVT, deep venous thrombosis; INR, international normalised ratio; PE, pulmonary embolism.

the therapy was given to them through their primary care centres.

According to the conclusions from the seventh consensus meeting of the American College of Chest Physicians,[7] patients were classified according to their risk of presenting thromboembolisms: high or standard risk. The patients with high risk of presenting a thromboembolic episode are those with mechanical cardiac valves, chronic atrial fibrillation with previous episodes of vascular accidents or with a history or rheumatoid endocarditis, a recent episode of systemic thromboembolism (less than 3 months ago), antiphospholipid syndrome, or thromboembolisms during a previous interruption of the OAC.

The surgical technique performed, as well as the type of administrative admission (major outpatient surgery, week-long hospital stay, and conventional admission), were chosen according to the surgeons preferences, without being determined by a pre-established protocol.

Objectives and follow-up

The principal variables were: major haemorrhage, thromboembolisms, and/or death of the patient. Major haemorrhage was defined as that which was evident and with, at least, one of the following characteristics: decrease in haemoglobin >2 g/dL, red blood cell transfusion, haemorrhage in vital organs, and re-intervention.

The secondary variables were: minor haemorrhage, hospital stay, and percentage of patients that underwent surgery in the outpatient surgery regime and short-stay surgery regime.

Follow-up of the patients was initiated with the interruption of the oral anticoagulation therapy and was finalised 30 days after the hernioplasty.

Statistical analysis

We have performed a descriptive study of the results. The variables are expressed in percentage or average and standard deviation, according to their characteristics.

Results

Forty-seven patients on oral anticoagulation therapy were identified (3.96% of the elective inguinal hernioplasties performed during the 2005-2007 period), 41 (87%) of which were males. The average age was 74 (10) years. The indications for chronic anticoagulant therapy were as follows: chronic atrial fibrillation in 29 (62%) cases, mechanical cardiac valve in 10 (21%), history of deep venous thrombosis or pulmonary embolism in 4 (9%), cerebral vascular accident in 2 (4%), and other diseases in 2 (4%) cases (Table 2). Twelve (25%) patients were classified in the high thromboembolic risk group; 14 (30%) patients presented an ASA III classification.

The average of the international normalised ratio (INR) on the day of the intervention was 1.3 (0.4). Regional anaesthesia was used in 39 (83%) patients. An anterior approach was used in all of the cases. A non-pressure hernioplasty was performed with polypropylene mesh (Lichtenstein and Rutkow-Robbins techniques), except for 2 cases. In 13 (28%) of the cases, it was a bilateral inguinal hernia. The average surgical time for the unilateral hernioplasty was 34 (8) min.

Six (13%) patients presented haematomas in the surgical wound: in 3 cases with haemorrhagic suffusion, which was resolved spontaneously; in 2 cases, the haematoma was drained; and 1 patient was readmitted for conservative therapy and modifications of the anticoagulant therapy. One (2.1%) patient suffered a major haemorrhage, with a

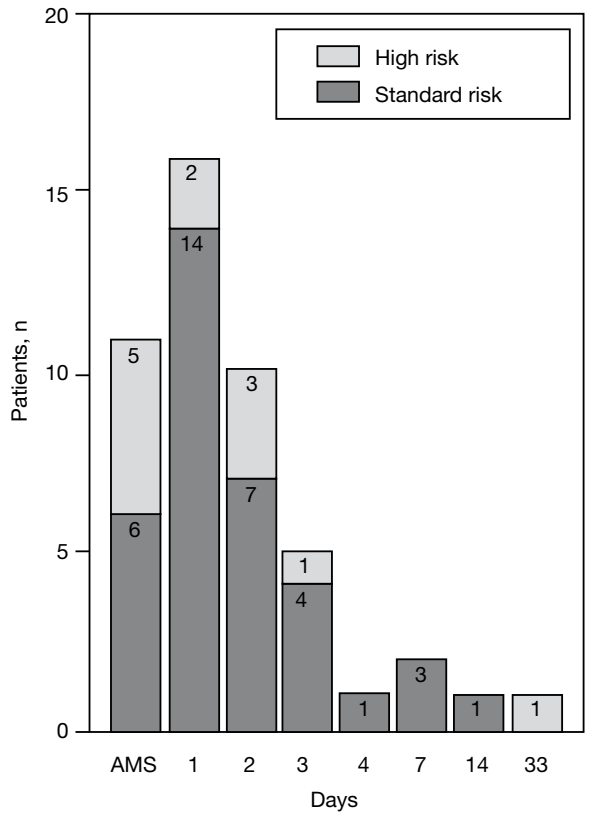

Figure – Duration of hospital stay according to thromboembolism risk. AMS indicates ambulatory major surgery.

bilateral haematoma from the surgical wound and a pre-peritoneal haematoma that compressed the bladder, and thus required surgical re-intervention; 5 (42%) patients from the high risk group and 1 (2.8%) of the moderate risk group suffered haemorrhagic complications. No patients presented thromboembolic episodes nor were there any deaths.

The average stay was 2.4 (5.1) days; 11 (23%) of the 12 patients programmed for major outpatient surgery were discharged on the same day of the intervention. Sixteen (34%) patients were surgically intervened in a short-stay surgery regime (Figure).

Discussion

This study analysed 47 patients who required a temporary interruption of their oral anticoagulation therapy to undergo an elective inguinal hernioplasty, where a standardised dosage of LMWH was used as BT. The results were: low risk of thromboembolisms (0%) or major haemorrhage (2%) and an acceptable risk of a haematoma of the surgical wound (13%). The rates of ambulatory surgery and short stay in this group of patients were 23% and 34%, respectively.

In our hospital, only 3.9% of the patients that underwent elective inguinal hernioplasties were on anticoagulant therapy. In spite of the fact that this rate may seem small, this clinical situation is not infrequent given that the inguinal hernioplasty is the most frequent surgical procedure in general surgery departments.[1] On the other hand, the life expectancy and co-morbidities of the patients increases in a progressive manner and, probably, the number of patients on OAC will increase in the future.[7,8] The complexity of a well established surgical procedure is seen to increase because of the peri-operative handling of this kind of patients. In spite of the fact that there is no agreement on what is the proper way to handle them,[3,9] different clinical guidelines recommend using a BT to prevent the serious consequences of a systemic thromboembolism.[2,10] The risk of a thromboembolic accident during the peri-operative period due to stopping oral anticoagulant therapy can be highly variable and it is related with the indication of de-coagulation. It can oscillate between 1% in the case of an isolated atrial fibrillation and 12% in a high risk atrial fibrillation or even 22% in a patient with a bi-disk mitral prosthesis. In these patients, a complication rate higher than 70%[11] can be expected. Generally, in those patients with low or intermediate risk, suspending OAC and starting a BT in prophylactic doses is recommended, while, in the high-risk group, starting BT with full doses is recommended. In the last few years, different experiments have been published using LMWH as BT, started even in an ambulatory manner.[2,6,10,12] We have adapted said protocols from the literature for patients with high and standard (moderate-low) risk of suffering a thromboembolic episode.[5,6,8] Most of the studies published have been written from a haematologist's perspective, and they analyse the results of patients that have undergone very diverse procedures (skin surgery, cataracts, major surgery, heart surgery...). In our study, a homogeneous group of patients who underwent the same surgical procedure is analysed, making it possible to obtain solid conclusions regarding the effectiveness and safety of our strategy in the elective inguinal hernioplasty.

The haemorrhage rates of the surgical wound and major haemorrhage were 13% and 2.1%, respectively. These values, despite being high,[13] are similar to those published by McLemore et al.[14] Other working groups accept values for major haemorrhages of <3%.[3,5,10-12] Our project, as a retrospective study, may underestimate the percentage of haemorrhage complications, although in our centre all patients are systematically controlled in the dispensary one week and three weeks after the intervention. Most of the complications took place in the high thromboembolic risk group, treated with full anticoagulant doses, while the percentage of haemorrhages in the standard risk group is similar to the normal population.

Efforts must be made to diminish the risk of haemorrhages in the high-risk group, without increasing thromboembolic complications. Maybe, as McLemore et al[14] proposed, not suspending the OAC but reducing the doses to obtain an INR<1.4 the day of the surgery could be a reasonable alternative in the elective surgery of inguinal hernias. In fact, over the last decade there has been a trend to continue the oral anticoagulation therapy in low haemorrhage risk procedures, such as skin surgery,[15] dental extraction,[16] or cataract surgery.[17]

To summarise, in patients that require a short interruption of their oral anticoagulation therapy to undergo an elective

inguinal hernioplasty, the standardisation of protocols with LMWH, as a bridging therapy, is a safe procedure that presents low risks of major haemorrhages and thromboembolic complications, and it can be carried out in an ambulatory setting. Therapy with oral anticoagulants is not a contraindication for the ambulatory inguinal hernioplasty.

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