REV BRAS ORTOP. 2016;xxx(xx):xxx–xxx

SOCIEDADE BRASILEIRA DE ORTOPEDIA E TRAUMATOLOGIA

RBO REVISTA BRASILEIRA DE ORTOPEDIA

www.rbo.org.br

Original Article

Does the suction drain diameter matter? Bleeding analysis after total knee replacement comparing different suction drain gauges☆

*Marcos George de Souza Leao**, *Gladys Martins Pedroza Neta*, *Thiago Montenegro da Silva*, *Yacov Machado Costa Ferreira*, *Waryla Raissa Vasconcelos Dias*

Fundação Hospital Adriano Jorge, Serviço de Ortopedia e Traumatologia, Manaus, AM, Brazil

ARTICLE INFO

Article history:
Received 27 November 2015
Accepted 7 January 2016
Available online xxx

Keywords:
Blood loss/surgical
Arthroplasty/replacement/knee
Drainage

ABSTRACT

Objectives: To evaluate bleeding and the estimated blood loss in patients who underwent total knee replacement (TKR) with different closed suction drains (3.2-mm and 4.8-mm gauge).

Methods: This was a randomized controlled trial with 22 patients who underwent TKR and were divided into two groups: Group I, with 11 patients in whom the 3.2-mm suction drain was used, and Group II, with 11 patients in whom the 4.8-mm suction drain was used. The hematocrit was measured after 24, 48 and 72 h after surgery in order to calculate the estimated blood loss. The drained volume was measured 3, 6, 12, 24, and 48 h after TKR, and thereafter both groups were compared.

Results: Regarding the hematocrit, there were no differences between groups in measured periods (24, 48, and 72 h after surgery). The total bleeding measured at the suction drains within 48 h was higher in Group II, with a statistically significant difference ($p = 0.005$); in the first 24 h, there was major bleeding in Group II (mean 893 mL), with a significant difference ($p = 0.004$). Between 24 and 48 h, there was no statistically significant difference in both groups ($p = 0.710$). The total estimated bleeding was higher in Group I, with mean of 463 mL, *versus* 409 mL in Group II, with no statistical significance ($p = 0.394$).

Conclusions: Bleeding was higher in the group that used the 4.8 mm gauge suction drain, with no differences in hematocrit and estimated blood loss.

☆ Study conducted at the Fundação Hospital Adriano Jorge, Serviço de Ortopedia e Traumatologia, Manaus, AM, Brazil.

* *Corresponding author.*
E-mail: mgsleao@uol.com.br (M.G. Leao).

http://dx.doi.org/10.1016/j.rboe.2016.08.014

Please cite this article in press as: Leao MG, et al. Does the suction drain diameter matter? Bleeding analysis after total knee replacement comparing different suction drain gauges. Rev Bras Ortop. 2016. http://dx.doi.org/10.1016/j.rboe.2016.08.014

A espessura do dreno suctor importa? Análise do sangramento após artroplastia total do joelho comparando drenos suctores de diferentes calibers

Palavras-chave:
Perda sanguínea cirúrgica
Artroplastia do joelho
Drenagem

RESUMO

Objetivos: Avaliar o sangramento através do dreno suctor (DS) e a perda sanguínea estimada em pacientes submetidos à artroplastia total do joelho (ATJ) com DS de diferentes calibers (3,2 mm e 4,8 mm).

Métodos: Ensaio clínico randomizado com 22 pacientes submetidos à ATJ, divididos em dois grupos; no grupo I, os pacientes recebiam o DS 3,2 mm e no Grupo II, o DS 4,8 mm. O hematócrito foi aferido 24, 48 e 72 horas após a cirurgia, a fim de calcular a perda sanguínea estimada. O débito do dreno foi medido 3, 6, 12, 24 e 48 horas após a ATJ e os dois grupos foram comparados.

Resultados: Em relação ao hematócrito, não se observaram diferenças estatisticamente significativas entre os grupos nos períodos aferidos (24, 48 e 72 horas pós-operatória). O sangramento total medido no DS nas 48 horas foi maior no grupo II, com diferença estatisticamente significativa (p = 0,005); nas primeiras 24 horas, houve maior sangramento no grupo II (média 893 mL), com diferença significativa (p = 0,004). Entre 24 e 48 horas, não foram observadas diferenças estatisticamente significativas em ambos os grupos (p = 0,710). O sangramento total estimado foi maior no Grupo I, com média de 463 mL, enquanto no Grupo II esse valor foi de 409 mL, sem significância estatística (p = 0,394).

Conclusões: O sangramento foi maior no grupo que usou DS 4,8 mm, sem diferenças no hematócrito e na perda sanguínea estimada.

Introduction

The use of a wooden tube as a drain into a wound is credited to Hippocrates, at around 400 BC.[1]

Total knee replacement (TKR) is a standardized surgical procedure with high success rates in the treatment of advanced degenerative osteoarthritis (OA) and rheumatoid arthritis of this joint. Substantial bleeding can occur in the subcutaneous and intra-articular space after TKR; this event can lead to blood transfusions, with their potential complications.[2] Drainage is commonly used with the theoretical purpose of preventing hematomas, which, in turn, may decrease joint mobility and reduce local tissue perfusion, increasing the possibility of infection. Thus, drains can also be used to lower the risk of infection and prevent healing delay in TKR.[3]

Primary TKR can lead to a reduction in the erythrocyte levels. Various strategies have been used in order to reduce the need for blood products, such as tourniquet placed at the thigh root, coagulation diathermy, knee position, clamped drains, infiltration with vasoconstrictor solutions, antifibrinolytics (tranexamic acid, Floseal®), and computer-assisted surgeries.[4]

The use of suction drains (SD) in arthroplasties is still controversial. It is believed that the drainage is limited only to a restricted area, failing to prevent infection if retrograde migration of bacteria occurs. Drains can also hamper rehabilitation in the immediate postoperative period. There is no obvious advantage of using SDs, other than lower need for dressing changes during surgery; moreover, in patients undergoing TKR with SDs, the risk of transfusion is higher.[5]

With the aging population, there has been increasing demand for joint replacements, which are effective methods to improve the quality of life with recovery of movement and improvement in pain, although these surgeries cause large blood loss and lead to dramatic consequences in patients with chronic illnesses; in prosthesis revision surgeries, the losses may be higher. There are formulas to better estimate blood loss; they are applied in studies to compare blood loss between different techniques performed in surgery.[6]

To date, it is known that there is no difference regarding rate of surgical site infection and problems with surgical wound or postoperative rehabilitation, whether or not drains are used; there is a tendency to greater blood loss, hematoma formation, higher rate of use of blood products, and delay in recovery of joint function when they are used.[7] In most publications that address TKRs with or without the use of SD, the study focus is bleeding and the rate of complications.[5]

The present study aimed to evaluate bleeding through the SD and the estimated blood loss, comparing patients who underwent TKR with SDs of different gauges (3.2 mm and 4.8 mm), as well as to observe the period in which the major bleeding occurs, which is justified by the lack of data in the literature on this particular topic.

Please cite this article in press as: Leao MG, et al. Does the suction drain diameter matter? Bleeding analysis after total knee replacement comparing different suction drain gauges. Rev Bras Ortop. 2016. http://dx.doi.org/10.1016/j.rboe.2016.08.014