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[Intervention Review]

Different types of intermittent pneumatic compression devices for preventing venous thromboembolism in patients after total hip replacement

Jin Min Zhao¹, Mao Lin He², Zeng Ming Xiao², Ting Song Li², Hao Wu², Hua Jiang²

¹Department of Orthopaedics Trauma and Hand Surgery, 1st Affiliated Hospital of Guangxi Medical University, Nanning, China. ²Division of Spinal Surgery, 1st Affiliated Hospital of Guangxi Medical University, Nanning, China

Contact: Mao Lin He, Division of Spinal Surgery, 1st Affiliated Hospital of Guangxi Medical University, 22 Shuangyong Road, Nanning, Guangxi, 530021, China. edwardheml@qq.com, edwardhe@hotmail.com.

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ABSTRACT

Background

Total hip replacement (THR) is an effective treatment for reducing pain and improving function and quality of life in patients with hip disorders. While this operation is very successful, deep vein thrombosis (DVT) and pulmonary embolism (PE) are significant complications after THR. Different types of intermittent pneumatic compression (IPC) devices have been used for thrombosis prophylaxis in patients following THR. Available devices differ in compression garments, location of air bladders, patterns of pump pressure cycles, compression profiles, cycle length, duration of inflation time and deflation time, or cycling mode such as automatic or constant cycling devices. Despite the widely accepted use of IPC for the treatment of arterial and venous diseases, the relative effectiveness of different types of IPC systems as prophylaxis against thrombosis after THR is still unclear.

Objectives

To assess the comparative effectiveness and safety of different IPC devices with respect to the prevention of venous thromboembolism in patients after THR.

Search methods

For this update the Cochrane Peripheral Vascular Diseases Group Trials Search Coordinator searched the Specialised Register (November 2014), CENTRAL (2014, Issue 10). Clinical trial databases were searched for details of ongoing and unpublished studies. Reference lists of relevant articles were also screened. There were no limits imposed on language or publication status.

Selection criteria

Randomized and quasi-randomized controlled studies were eligible for inclusion.

Data collection and analysis

Two review authors independently selected trials, assessed trials for eligibility and methodological quality, and extracted data. Disagreement was resolved by discussion or, if necessary, referred to a third review author.

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Main results

Only one quasi-randomized controlled study with 121 study participants comparing two types of IPC devices met the inclusion criteria. The authors found no cases of symptomatic DVT or PE in either the calf-thigh compression group or the plantar compression group during the first three weeks after the THR. The calf-thigh pneumatic compression was more effective than plantar compression for reducing thigh swelling during the early postoperative stage. The strength of the evidence in this review is weak as only one trial was included and it was classified as having a high risk of bias.

Authors' conclusions

There is a lack of evidence from randomized controlled trials to make an informed choice of IPC device for preventing venous thromboembolism (VTE) following total hip replacement. More research is urgently required, ideally a multicenter, properly designed RCT including a sufficient number of participants. Clinically relevant outcomes such as mortality, imaging-diagnosed asymptomatic VTE and major complications must be considered.

PLAIN LANGUAGE SUMMARY

Different types of intermittent pneumatic compression devices for preventing venous thromboembolism after total hip replacement

Total hip replacement (THR) is an orthopedic procedure which has been performed for decades now to reduce pain and improve function and quality of life in people with severe hip disorders. It shows excellent results in terms of both improved function and value for money. While this operation is very successful, patients are at high risk of developing venous thromboembolic disease such as deep vein thrombosis (DVT) and pulmonary embolism (PE) in the immediate postoperative period. Intermittent pneumatic compression (IPC) devices are used to decrease the risk of such events. There are several different types of IPC device with variations in their design, including the rate and means of compression. We looked for randomized controlled trials which compared different types of IPC devices for preventing venous thromboembolism in patients after THR. We found one study with 121 participants comparing a calf-thigh compression device with a foot (plantar) compression device. There were no cases of symptomatic DVT or PE either in the calf-thigh compression group or the plantar compression for reducing thigh swelling one week following surgery. The postoperative swelling in the calf-thigh pump group was reduced earlier than in the plantar pump group. However, other outcomes such as imaging-diagnosed asymptomatic VTE were not determined and it is not possible to draw reliable conclusions from this single study with a high risk of bias. We therefore suggest that more primary research is required to allow an informed choice of IPC device for preventing venous thromboembolism following THR.

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