

Stockings 'no help' after a stroke

Behind the Headlines

Brought to you by the NHS Knowledge Service

Thursday May 28 2009



The stockings increase blood flow and reduce risk of blood clots

"Surgical stockings commonly given to stroke patients to prevent blood clots do not work," *The Times* reported. It said that research has found that compression stockings have no effect in preventing deep-vein thrombosis (DVT) in people who have had a stroke. The newspaper said that the stockings should still be used for patients who have had surgery and by people travelling on long-haul flights.

These results are from a large study of over 2,000 patients that showed that those who used the stockings for one month had the same chance of suffering DVT as those who did not (about a one in 10 chance). Patients who wore the stockings were also at an increased risk of blisters and ulcers.

This trial was large and well designed, and as such it would probably have found an effect from the stockings if they did have one. It provides the best evidence to date that compression stockings are not helpful for stroke patients. As reported, compression stockings are still recommended for patients who have undergone surgery and for some people travelling on long-haul flights.

Where did the story come from?

The research was carried out by a group known as the CLOTS trial collaboration, the chief investigator of which is Professor Martin Dennis from the University of Edinburgh. The research was funded by the Medical Research Council (UK), Chief Scientist Office of Scottish Government, Chest, Heart and Stroke Scotland, Tyco Healthcare (Covidien) USA, and the UK Stroke Research Network. The study was published in the peer-reviewed medical journal *The Lancet*.

If compression stockings did improve the outcomes of stroke patients, this large trial would probably have detected it.

What kind of scientific study was this?

This randomised controlled trial (RCT) assessed the effectiveness of thigh-length graduated compression stockings (GCS) in reducing deep-vein thrombosis (DVT) after stroke. Stockings are one of several methods used to increase blood flow to the calf muscles and reduce the risk of blood clots in the legs. They are commonly used in a variety of situations where DVT is possible.

Many stroke patients are unable to walk when they are admitted to hospital, and this lack of movement means the risk of blood clots is increased. The researchers say that guidelines for anticoagulation and external compression with GCS vary across the world. Also, most of the studies to date on the use of stockings have been conducted in people having surgery, with the assumption made by groups developing guidelines that the same effects might be seen in stroke patients.

Between 2001 and 2008, patients were enrolled from 55 stroke centres in the UK, seven in Italy and two in Australia. Only immobile patients (defined as being unable to walk independently to the toilet) who had been admitted within a week of having a stroke were included. The researchers excluded patients with fragile skin or circulation problems in the legs and those who had strokes due to brain bleeds. In all, 2,518 patients were enrolled and randomised to having either thigh-length GCS (1,256 patients) with routine care (aspirin and assisted exercise) or to avoiding GCS (1,262 patients) with routine care.

Patients given GCS wore thigh-length stockings on both legs as soon as possible after randomisation. They wore them day and night until they were independently mobile around the ward, were discharged, refused to wear them or the staff became concerned about their skin. Patients allocated to avoid GCS were not given stockings unless they had another clear need for them.

The patients' legs were tested for DVT with ultrasound (a compression Doppler ultrasound) at about 7–10 days after randomisation and again at 25–30 days. The study was single blinded, meaning that the technician who did the tests was unaware which group the patients were in.

The researchers looked for the occurrence of symptomatic or asymptomatic DVT behind the knee or in the thigh (femoral) veins. They also counted any complications, such as skin breaks and ulcers.

All patients were analysed in the groups to which they had first been allocated, regardless of whether or not they actually used the stockings in the end. This means that even if patients in the group that avoided GCS were eventually given stockings, they were analysed as if they had not been. This is the best way to analyse the data, but does reduce the chance of finding a difference between the groups. The researchers took into account the fact that some people died from their stroke before developing a clot, and adjusted for the delay between stroke onset and randomisation, stroke severity and leg strength.

What were the results of the study?

After 30 days, there was no significant difference in blood clot rate between the groups. In the GCS group, 126 patients (10%) developed clots, whereas in the group that avoided stockings, 133 patients (10.5%) developed clots. This represented a difference of 0.5% (95% CI 1.9% to 2.9%).

The odds of developing a clot with stockings compared to without was 0.98 (95% CI 0.76 to 1.27), suggesting that there was no statistically significant difference between the groups.

The group given stockings experienced more skin breaks, ulcers and blisters (5%) than those without stockings (1%).

What interpretations did the researchers draw from these results?

The researchers say, "these data do not lend support to the use of thigh-length GCS in patients admitted to hospital with acute stroke". They go on to suggest, "national guidelines for stroke might need to be revised on the basis of these results".

What does the NHS Knowledge Service make of this study?

This large international study included more patients and outcome events (clots) than all previous randomised trials of GCS combined. Some points of note:

- The researchers were careful to ensure that there were enough patients in the trial to detect a difference between the treatments if there was one. For example, before the trial started they estimated they would need about 1,500 patients to provide a good chance (90% power) of identifying a 6% reduction in the rates of clots (from 15% to 9%). They increased the number of patients recruited from 2006 to ensure that the numbers would be sufficient to detect a "clinically worthwhile" difference of 4%. The fact that the difference was 0.5% suggests that it is very unlikely that they have missed a clinically worthwhile treatment effect due to lack of patient numbers.
- Other strengths to this study include the central randomisation, the blinding of technicians assessing the outcome and the fact that most patients were followed up. This all helps to keep bias (the chance of a misleading result) to a minimum.
- Slightly more patients in the GCS group died before the two ultrasounds could be completed (90 patients) compared with the no-stockings group (82 patients) and, although this may have affected the results, the researchers analysed the data to take this into account. Almost four-fifths of patients assigned GCS (79.4%) wore the stockings for two weeks, and slightly fewer wore them for the full 30 days (73.1%). This represents a reasonably high level of compliance with wearing stockings and means that the lack of a difference was not that people allocated to GCS simply took their stockings off.

If compression stockings did improve the outcomes of stroke patients, this large trial would probably have detected it. As such, these findings indicate that they are probably of no benefit for this condition. However, they should not be interpreted as implying that, in other situations, such as after surgery, compression stockings are not useful. People considering flying who think they may be at increased risk should consult a GP.

Links to the headlines

[Surgical stockings 'don't stop clots in stroke patients'](#). *The Times*, May 28 2009

[Surgical stockings 'do not work for stroke patients'](#). *The Daily Telegraph*, May 28 2009

[Anti-clot socks 'don't help stroke patients' so does wearing them on a plane really beat DVT?](#) *Daily Mail*, May 28 2009

[Stockings 'no stroke clot help'](#). BBC News, May 28 2009

Links to the science

The CLOTS Trials Collaboration. [Effectiveness of thigh-length graduated compression stockings to reduce the risk of deep vein thrombosis after stroke \(CLOTS trial 1\): a multicentre, randomised controlled trial](#). *The Lancet* 2009; Early Online Publication, 27 May 2009

Further reading

Amaragiri SV, Lees T. [Elastic compression stockings for prevention of deep vein thrombosis](#). Cochrane Database of Systematic Reviews 2000, Issue 1

Clarke MJ, Hopewell S, Juszczak E, Eisinga A, Kjeldstrøm M. [Compression stockings for preventing deep vein thrombosis in airline passengers](#). Cochrane Database of Systematic Reviews 2006, Issue 2

Comments

Analysis by [Bazian](#).

Edited by **NHS Choices**