

Ankle Brachial Pressure Index and compression application: Review summary

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ABSTRACT

Venous leg ulcers (VLUs) are a significant complication amongst persons with chronic venous insufficiency (CVI) that frequently follow a cycle of healing and recurrence. Current clinical practice guidelines (CPGs) recommend applying below knee compression to improve VLU healing. Compression could be applied if the Ankle Brachial Pressure Index (ABPI) rules out significant arterial disease, as sufficient peripheral arterial circulation is necessary to ensure safe compression use. We conducted a content analysis of 13 global CPGs on the accuracy of recommendations related to ABPI and compression application. Eight CPGs indicated that compression is recommended when the ABPI is between 0.8 and 1.2 mmHg. However, this review found there is disagreement between 13 global VLU CPGs, with a lack of clarity on whether or not compression is indicated for patients with ABPIs between 0.6 and 0.8 mmHg. Some CPGs recommend reduced compression for treatment of VLUs, while others do not recommend any type of compression at all. This has implications for when it is safe to apply compression, and the inconsistency in evidence indicates that specialist advice may be required at levels beyond the ABPI “safe” range listed above.

QUESTION

What is the best available evidence to guide compression application in venous leg ulcers (VLUs) after a vascular assessment including ABPI?

REVIEW SUMMARY

Venous leg ulcers (VLUs) are a significant complication amongst persons with chronic venous insufficiency (CVI) that frequently follow a cycle of healing and recurrence¹. Current clinical practice guidelines (CPGs) recommend applying below knee compression to improve VLU healing². Compression could be applied if the Ankle Brachial Pressure Index (ABPI) rules out significant arterial disease², as sufficient peripheral arterial circulation is necessary to ensure safe

compression use². A content analysis of 13 global CPGs was conducted on the accuracy of recommendations related to ABPI measures and compression application, in order to aid clinicians' understanding of the best available evidence in this area. Eight CPGs indicated that compression is recommended when the ABPI is between 0.8 and 1.2 mmHg. However, this review concluded that there is disagreement between 13 global VLU CPGs, with a lack of clarity on whether or not compression is indicated for patients with the ABPI between 0.6 and 0.8 mmHg. Some CPGs recommend reduced compression for treatment of VLUs, while others do not recommend any type of compression altogether. This has implications for when it is safe to apply compression, and the inconsistency in evidence indicates that specialist advice may be required at levels beyond the ABPI "safe" range listed above.

METHODOLOGY

We conducted a qualitative and quantitative content analysis of 13 global CPGs on the accuracy of recommendations related to ABPI and compression application.

Search strategy

Global CPGs (or best practice recommendations) were located using a search of Scopus and PubMed (years 2000 to present). In addition, references in the CPG review article³ were manually searched to find more CPGs.

Inclusion criteria

CPGs were only included if they were described as such, were original, discussed VLUs or CVIs, and were published between 2000 and 2018. Additional items for assessment and incorporation included methodology used, population, personnel used for assessment, accuracy, specialist referral recommendations, indications, contradictions, and precautions for compression therapy. This search resulted in 2648 records, and after removing duplicates, 2502 titles and abstracts remained; 34 were retained for full text screening after assessing for eligibility, and in addition, 22 full text articles were added from a paper by Andriessen *et al.*³. Of these 56 articles, 43 did not meet all inclusion criteria, leaving 13 for analysis and synthesis. A PRISMA diagram was provided in the original review⁴.

Data analysis and synthesis

Three independent reviewers (under the guidance of senior co-authors) completed data analysis and synthesis. The quantitative analysis focused on ABPIs as a score, while the qualitative analysis analysed the description of methodology, evidence rating, ABPI measurement, compression indication and contraindication, precaution, and referrals.

ABPI AND COMPRESSION APPLICATION

ABPI measurement recommendations

As arterial disease can complicate treatment of VLUs⁴, measurement of a patient's ABPI to assess peripheral

arterial insufficiency is necessary. The most commonly recommended method is Doppler ultrasound.

Across 13 CPGs, 10^{2,6-14} explicitly recommended that ABPI should be assessed to rule out any form of peripheral arterial disease. Nine of these recommended that Doppler be used, and one did not specify a method⁷. Only three¹⁵⁻¹⁷ did not explicitly state that ABPI should be measured to rule out peripheral arterial disease.

In patients with VLUs, appropriately trained or suitably trained medical staff should assess ABPI, including GPs and physicians^{8,9,12,13}. The quality of the initial assessment is vital to ensure that patients receive appropriate management of their VLU. However, the CPGs do not suggest when to refer patients for specialist assessment.

ABPI interpretations

Six CPGs report that ABPI scores should be interpreted with caution, pending assessment for arterial calcification or diseases that lead to arterial calcification^{2,7,9,10-12}. Of these, four CPGs suggested or explicitly stated that ABPI should be interpreted in the context of the patient's general health, including combined clinical features, heart or vascular risk factors, or other assessments of peripheral arterial disease^{2,6,9,10}. One CPG² suggested that untrained personnel may incorrectly interpret ABPI scores, further suggesting that ABPI assessment and interpretation should be done by appropriately trained personnel.

ABPI and compression indication

Eight of the 13 CPGs provided recommendations for indication for compression (using ABPIs). Five CPGs^{2,6,7,10,12} proposed that compression could be safely initiated when the ABPI is above 0.8, although the suggested level of compression varied. Of these CPGs, one¹⁴ suggested 0.6 or above was safe, with two suggesting that an ABPI at 0.8^{6,12} was safe as well. Two CPGs^{8,15} suggested that low level or reduced compression was safe to begin below 0.8, with one⁸ suggesting the minimum threshold for low compression was 0.5, and the other 0.6¹⁵. One CPG suggested that compression can be safely used below 1.3¹⁴, and another suggested safe compression below 1.2¹⁰.

ABPI and compression contraindications

There was little agreement between the six CPGs on the ABPI at which compression was contradicted. These contraindications ranged from < 0.5 ⁸, ≤ 0.5 ^{6,14}, < 0.6 ¹⁵, < 0.7 ⁷ and $< 0.8 > 1.2$ ².

Compression with close monitoring was generally recommended at certain ABPIs, although the exact index was varied. Two CPGs^{6,8} recommended compression with close monitoring when the ABPI is greater than 0.5. Three CPGs^{2,8,12} also suggested close monitoring with compression when the ABPI is below 0.8. One CPG suggested compression with close monitoring is necessary when the ABPI is above 1.2.

Box 1: Clinical practice recommendations

- Conduct a risk assessment for VLU patients that considers an individual's ABPI against current guideline recommendations.
- Compression is indicated for patients with ABPI between 0.8 to 1.2.
- Compression is not recommended for patients with ABPI over 1.2, although it is advised that toe brachial pressure index (TBPI) also be calculated for individuals with ABPI above 1.3, as this is more accurate for detecting arterial perfusion in the toes and feet of those with diabetes and kidney disease.
- Dermatologists should be consulted if ABPI is over 1.2 or below 0.8 mmHg.
- If patient's ABPI is between 0.6 and 0.8, but the patient does not exhibit signs or symptoms of peripheral arterial disease (PAD) or diabetes mellitus, graduated compression therapy should aim for greater than 30 mmHg (elastic) or the use of a high stiffness system (inelastic). Compression should be applied by a trained health professional and in accordance with manufacturer instructions.
- For those with ABPI between 0.6 and 0.8, ABPI reassessment should be repeated every 12 weeks.

ABPI and referrals to specialists

CPG recommendations for when to refer to specialists differed between the reviewed guidelines. When ABPI is below 0.8, specialist referral was recommended by two CPGs^{2,12}. One CPG⁶ suggested that referral is needed when the ABPI is lower than 0.9. When the ABPI is above 1.2, two CPGs recommended referral^{2,12}. When the ABPI is above 0.85, one CPG¹⁰ suggested superficial venous surgery with compression. Another CPG suggests investigation when the ABPI is less than 0.8, specifically via duplex scan⁹.

ABPI and VLU prevention

Eight of the 13 reviewed CPGs^{2,6-8,10-12,15} discussed the use of compression for VLU prevention. Of the eight that discussed the use of compression for prevention, five provided the level of compression^{2,8,10,11,15}. This was varied; one recommended that compression should start at 20 mmHg at the minimum, and increase to the highest tolerable pressure to an ideal of 30–40 mmHg¹⁰. Another suggested between 18–30 mmHg pressure², while yet another suggested between 40–50 mmHg⁸.

CONCLUSIONS AND FUTURE DIRECTIONS:

From this research, it is strongly recommended that clinicians treating VLUs follow the clinical practice recommendations as outlined in Box 1. As a considerable amount of variation exists in CPGs about how VLUs should be treated, clinicians should also consider speaking to wound specialists, and/or seek further training when unsure. Future research should address the safety of compression when the ABPI is below 0.8, as a degree of uncertainty exists. Specifically, future research should employ a longitudinal prospective design to address the efficacy and safety of compression in those with the ABPI between 0.6 and 0.8, as there is insufficient high-quality data in this area.

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CONFLICT OF INTERESTS

The authors have no conflict of interest to declare.

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