Clinical Use of Pulse Wave Analysis: Proceedings From a Symposium Sponsored by North American Artery

Clinical Case Example IV: Uncontrolled Hypertension

Clinical Question: Add or titrate, and what medication?

- 45-year-old man with diabetes, obesity, and hypertension
- Office BP recorded as 174/104 mm Hg.
- Medications: Metformin 1 g twice daily, perindopril 5 mg daily, and indapamide 1.25 mg daily

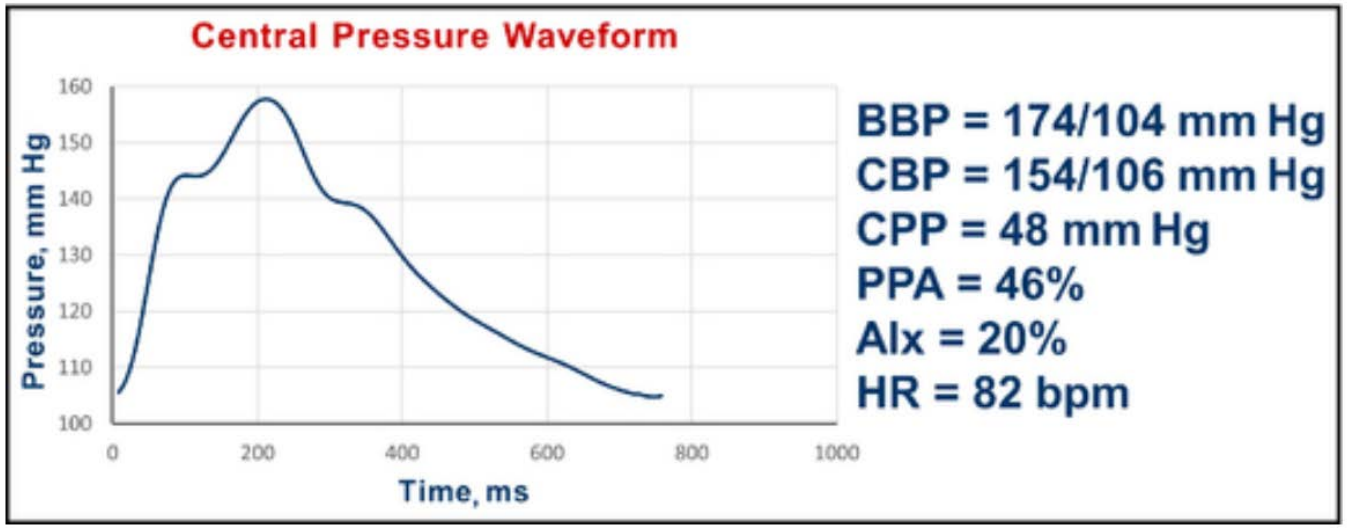
Initial PWA is shown in Figure 10.

Townsend RR et al. *Journal of Clinical Hypertension.* 2015; 17:7, 503–513.
DOI: 10.1111/jch.12574
http://bit.ly/2gc5mdD

Clinical Use of Pulse Wave Analysis: Proceedings From a Symposium Sponsored by North American Artery

Clinical Case Example IV

Figure 10



Interpretation:

The central pressure profile indicated a pulse pressure amplification of 46%. The central systolic pressure of 154 mm Hg is more than the desired value of 124 mm Hg. The AIx was 20%.

BBP indicates brachial blood pressure systolic/diastolic; CBP, central blood pressure systolic/diastolic; CPP, central pulse pressure; AIx, augmentation index; HR, heart rate; bpm, beats per minute.

Townsend RR et al. *Journal of Clinical Hypertension.* 2015; 17:7, 503–513.
DOI: 10.1111/jch.12574
http://bit.ly/2gc5mdD

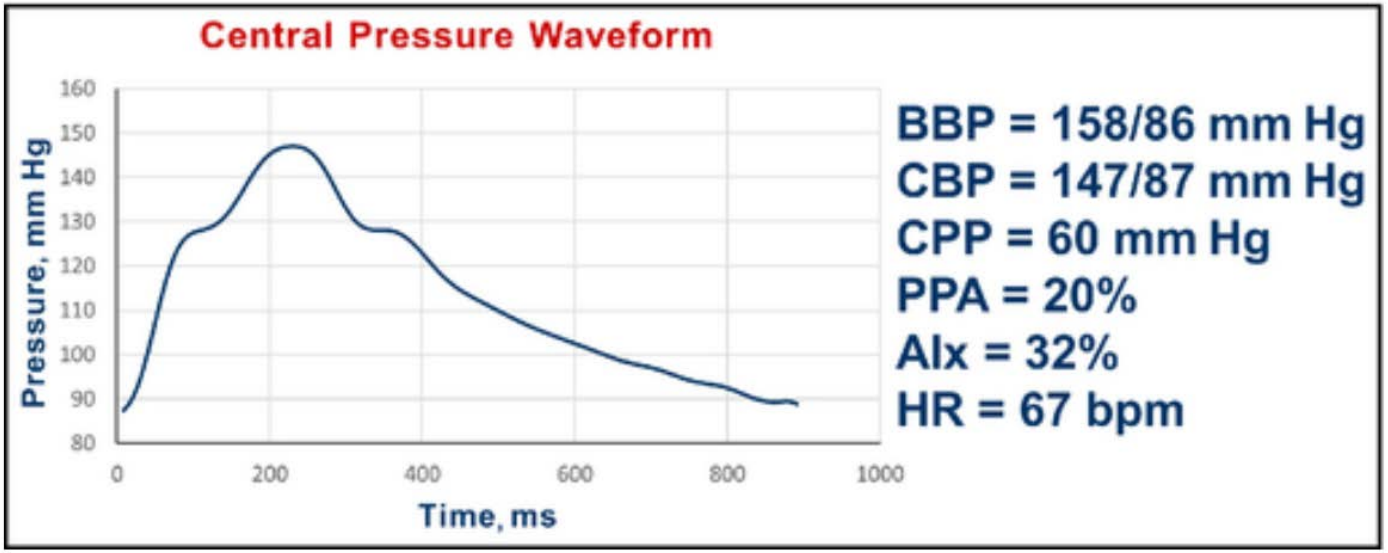
Clinical Use of Pulse Wave Analysis: Proceedings From a Symposium Sponsored by North American Artery

Clinical Case Example IV

Intervention:

The first step taken to treat the elevated brachial BP, given the heart rate of 82 beats per minute, was the use of atenolol 50 mg daily. The patient returned 3 weeks later taking atenolol, perindopril, and indapamide, and the pulse waveform analysis showed the pattern (Figure 11).

Figure 11



BBP indicates brachial blood pressure systolic/diastolic; CBP, central blood pressure systolic/diastolic; CPP, central pulse pressure; AIx, augmentation index; HR, heart rate; bpm, beats per minute.

Townsend RR et al. *Journal of Clinical Hypertension.* 2015; 17:7, 503–513.
DOI: 10.1111/jch.12574
http://bit.ly/2gc5mdD

Clinical Use of Pulse Wave Analysis: Proceedings From a Symposium Sponsored by North American Artery

Clinical Case Example IV

Interpretation:

Predictably (see Table 1), although the brachial BP improved, the pulse pressure amplification fell from 46% to 20%. The central systolic pressure of 147 mm Hg remains more than the desired value of 124 mm Hg. The AIx increased from 20% to 32%.

Table 1. General Effects of Antihypertensive Drugs on Central Pressures

	Central Systolic Pressure	Augmentation Index
Angiotensin receptor blockers	↓↓	↓↓
Angiotensin-converting enzyme inhibitors	↓↓	↓↓
β-Blockers	↓ or <–>	↑
Calcium channel blockers	↓↓	↓↓
Diuretics	↓	↓
Organic nitrates	↓↓	↓↓↓↓

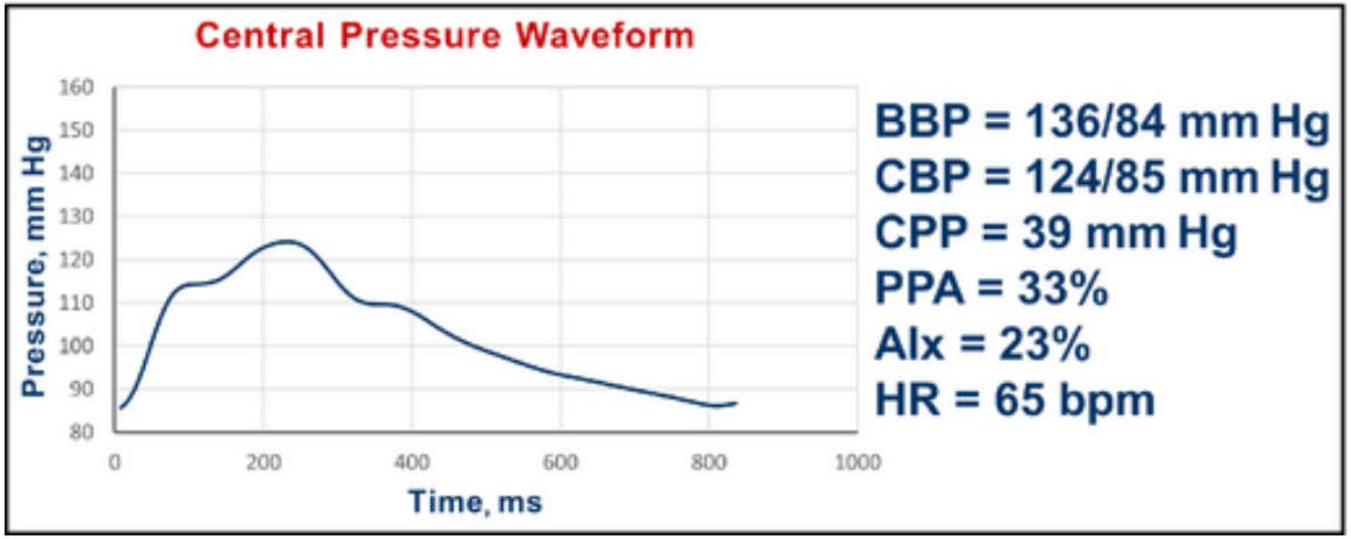
Townsend RR et al. *Journal of Clinical Hypertension.* 2015; 17:7, 503–513.
DOI: 10.1111/jch.12574
http://bit.ly/2gc5mdD

Clinical Case Example IV

Intervention:

Improvement in the brachial pressure was attended by less desirable changes in the central pressure profile. Amlodipine was added to reduce brachial pressure further and to offset the changes in central pressure from atenolol treatment. The third measurement is shown in Figure 12.

Figure 12



BBP indicates brachial blood pressure systolic/diastolic; CBP, central blood pressure systolic/diastolic; CPP, central pulse pressure; AIx, augmentation index; HR, heart rate; bpm, beats per minute.

Townsend RR et al. *Journal of Clinical Hypertension.* 2015; 17:7, 503–513.
DOI: 10.1111/jch.12574
http://bit.ly/2gc5mdD

Clinical Use of Pulse Wave Analysis: Proceedings From a Symposium Sponsored by North American Artery

Clinical Case Example IV

Interpretation:
The brachial BP improved further and the central pulse pressure amplification is 33%. The central systolic pressure of 124 mm Hg is near the desired value of 124 mm Hg. The AIx fell from 32% to 23%. No further changes were made.

Summary:
This example shows the added value of central pressure measurements in a circumstance where improvement in brachial pressure is not attended by a parallel improvement in central pressures.

Townsend RR et al. *Journal of Clinical Hypertension.* 2015; 17:7, 503–513.
DOI: 10.1111/jch.12574
http://bit.ly/2gc5mdD