Cas particuliers de mesure de la PA

Dr Miriana DINIC

Cas particuliers

1. Mesure de la PA chez le patient obèse

2. Mesure de la PA chez le patient hémodialysé

3. Mesure de la PA au membre inférieur

Mesure de la PA chez le patient obèse

Importance d'un brassard adapté

Cuff characteristics

- Electronic devices have their own cuffs, which are not interchangeable with those of other monitors even of the same brand.
- The selection of an appropriate cuff size is crucial for accurate BP measurement and depends on the arm circumference of each individual. A smaller than required cuff overestimates BP and a larger underestimates BP. A single cuff cannot fit the range of arm sizes of all adults.
- *Manual auscultatory devices*: use a cuff with inflatable bladder length which is 75–100% of the individual's middle upper-arm circumference and width 37–50% of the arm circumference.
- *Automated electronic devices*: select cuff size according to the device's instructions. Some devices have 'wide-range' cuffs, which fit the arm of most adults, but require proper validation.
- *People with large arms (mid-arm circumference >42 cm)*: prefer a conic-shape cuff as rectangular cuff may overestimate BP. When BP cannot be measured using an upper-arm cuff device, a validated electronic wrist-cuff device may be used.
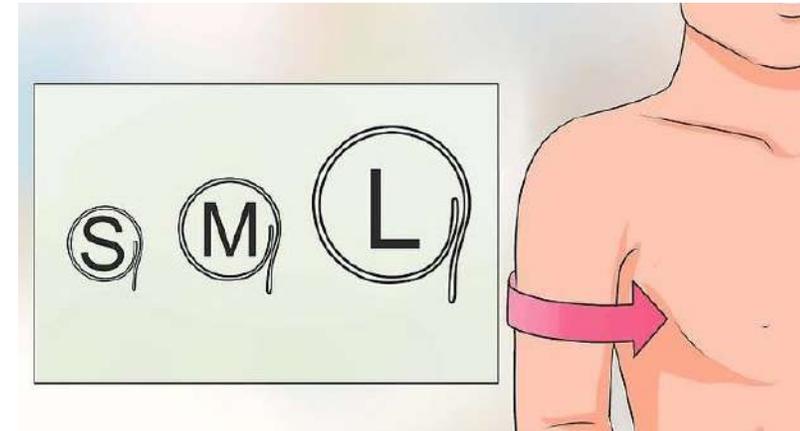
TABLE 2. Example of cuff use (inflatable bladder dimensions) for reference auscultatory blood pressure measurement in a general population validation study including children

Bladder dimensions	Participant's mid-arm circumference (cm)					
	12–15	15–18	18–23	23–28	28–35	33–42
Length (cm)	12	15	18	23	28	33
Width (cm)	6	7	9	12	14	16

2021 European Society of Hypertension practice guidelines for office and out-of-office blood pressure measurement , J Hypertens 39:1293–1302

Importance d'un brassard adapté

Cuff characteristics

- Electronic devices have their own cuffs, which are not interchangeable with those of other monitors even of the same brand.
- The selection of an appropriate cuff size is crucial for accurate BP measurement and depends on the arm circumference of each individual. A smaller than required cuff overestimates BP and a larger underestimates BP. A single cuff cannot fit the range of arm sizes of all adults.
- *Manual auscultatory devices*: use a cuff with inflatable bladder length which is 75–100% of the individual's middle upper-arm circumference and width 37–50% of the arm circumference.
- *Automated electronic devices*: select cuff size according to the device's instructions. Some devices have 'wide-range' cuffs, which fit the arm of most adults, but require proper validation.
- *People with large arms (mid-arm circumference >42 cm)*: prefer a conic-shape cuff as rectangular cuff may overestimate BP. When BP cannot be measured using an upper-arm cuff device, a validated electronic wrist-cuff device may be used.
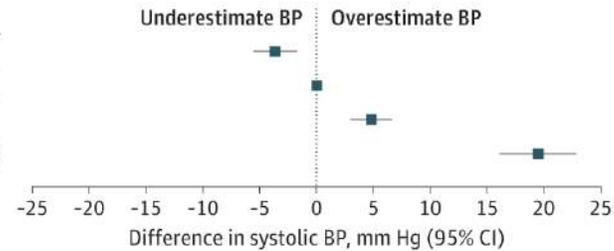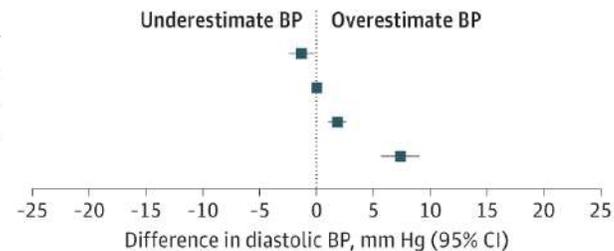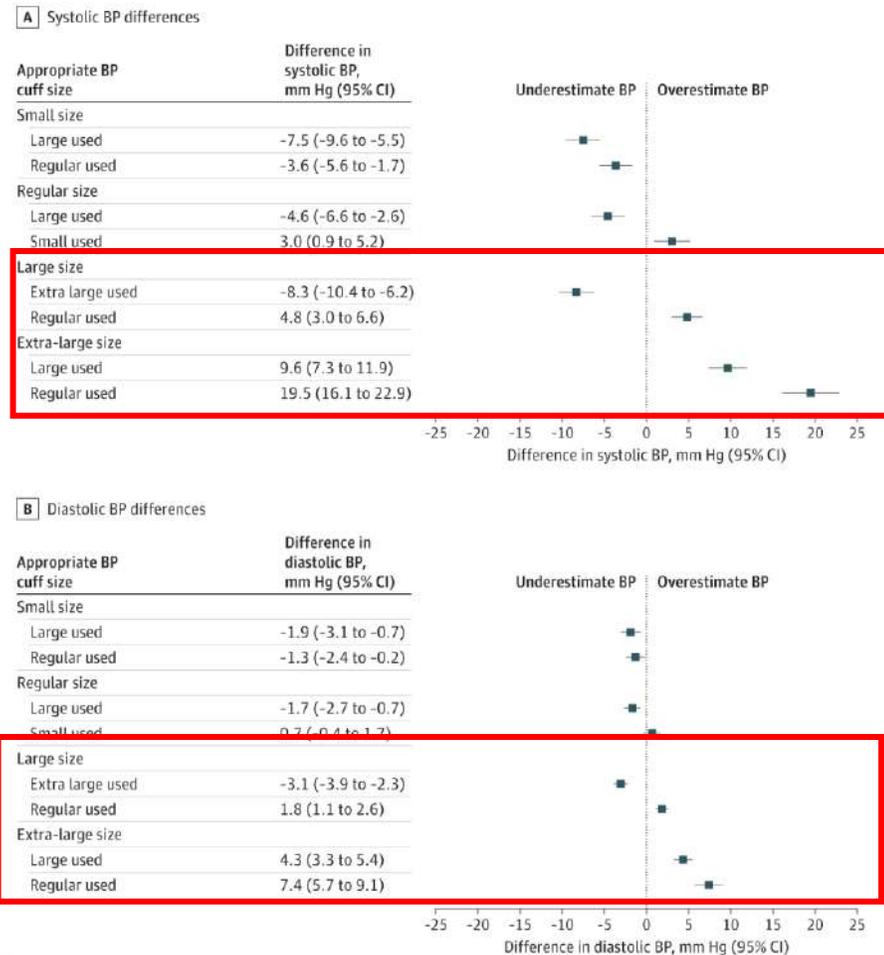
Figure Legend:

Mean BP Difference When an Appropriately Sized BP Cuff Was Used vs a Regular BP Cuff SizeBlood pressures (BPs) were based on the average of triplicate BP readings.

Mean Difference in BP When a Too-Small or Too-Large BP Cuff Was Used vs an Appropriately Sized BP Cuff, Stratified by Appropriate BP Cuff SizeThis analysis determined the effect of using too-small or too-large blood pressure (BP) cuffs across multiple BP cuff sizes on readings. Blood pressures were based on the average of triplicate BP readings.

Importance d'un brassard adapté

Cuff characteristics

- Electronic devices have their own cuffs, which are not interchangeable with those of other monitors even of the same brand.
- The selection of an appropriate cuff size is crucial for accurate BP measurement and depends on the arm circumference of each individual. A smaller than required cuff overestimates BP and a larger underestimates BP. A single cuff cannot fit the range of arm sizes of all adults.
- *Manual auscultatory devices*: use a cuff with inflatable bladder length which is 75–100% of the individual's middle upper-arm circumference and width 37–50% of the arm circumference.
- *Automated electronic devices*: select cuff size according to the device's instructions. Some devices have 'wide-range' cuffs, which fit the arm of most adults, but require proper validation.
- *People with large arms (mid-arm circumference >42 cm):* prefer a conic-shape cuff as rectangular cuff may overestimate BP. When BP cannot be measured using an upper-arm cuff device, a validated electronic wrist-cuff device may be used.

2021 European Society of Hypertension practice guidelines for office and out-of-office blood pressure measurement , J Hypertens 39:1293–1302

Importance d'un brassard adapté
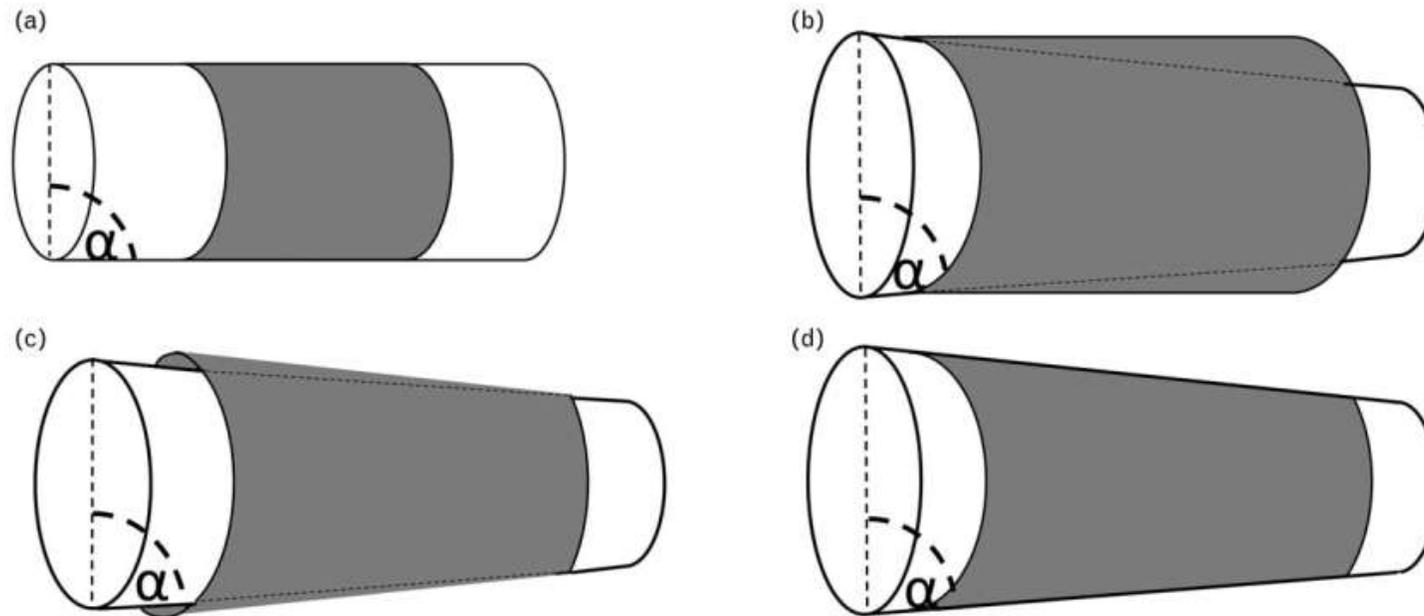
Palatini *et al.*

FIGURE 2 Different combinations of cuffs and upper-arm models. (a) Cylindrical cuff of standard size on a cylindrical arm with a 27 cm middle circumference. The slant angle (α) is 90° for both cuff and arm. No air gap is present between cuff and arm surface. (b) Extra-large cylindrical cuff on a troncoconical arm with a 44 cm middle circumference. The slant angle is 90° for the cuff and 85° for the arm. An important air gap is present on the distal part of the arm, which will affect the pressure transmission from the cuff to the brachial artery. (c) Extra-large troncoconical cuff on a troncoconical arm with a 38 cm middle circumference. The slant angle is 85° for the cuff and 87° for the arm. A modest air gap is present on the proximal part of the arm, which may affect the pressure transmission to the brachial artery. (d) Extra-large troncoconical cuff on a troncoconical arm with a 44 cm middle circumference. The slant angle is 85° for both cuff and arm. No air gap is present between cuff and arm ensuring an even compression of the brachial artery under the cuff.
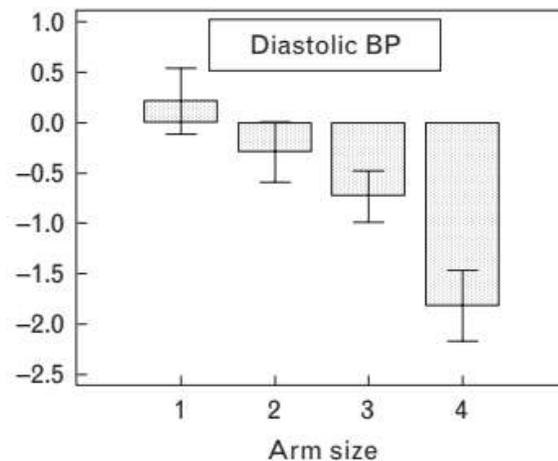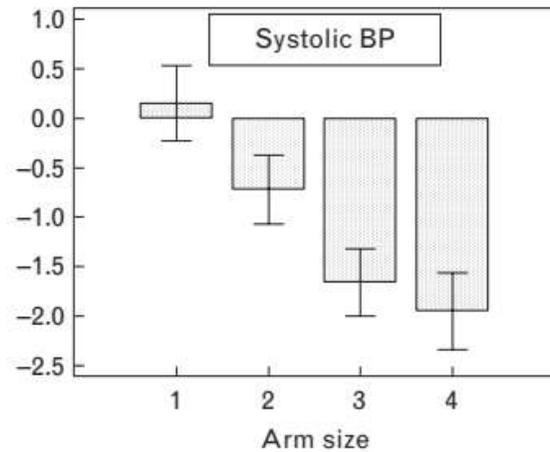
Brassard conique vs brassard cylindrique

TABLE 1. Dimensions of the four conical cuffs used in the participants

	Group 1	Group 2	Group 3	Group 4
Arm size (cm)	22–27	27.5–32	32.5–37	37.5–42.5
Proximal length (cm)	23.3	28	33	38.2
Middle length (cm)	22	26	30	34
Distal length (cm)	20.7	24	27	29.8
Width (cm)	11	13	15	17
Frustum of cone slant angle (°)	87.9	87.2	86.4	85.5

FIGURE 2 SBP and DBP discrepancies between the tronco-conical and the cylindrical cuffs in the four groups of participants with increasing arm size. Data are mean ± SEM and are adjusted for age and sex. A negative value indicates that the cylindrical cuff measurement is greater than the tronco-conical cuff measurement. Results of analysis of covariance: SBP, $F = 6.4$, $P < 0.001$; group 4, $P = 0.001$ versus group 1; group 3, $P = 0.002$ versus group 1. DBP, $F = 7.9$, $P < 0.001$; group 4, $P < 0.001$ versus group 1. BP, blood pressure.

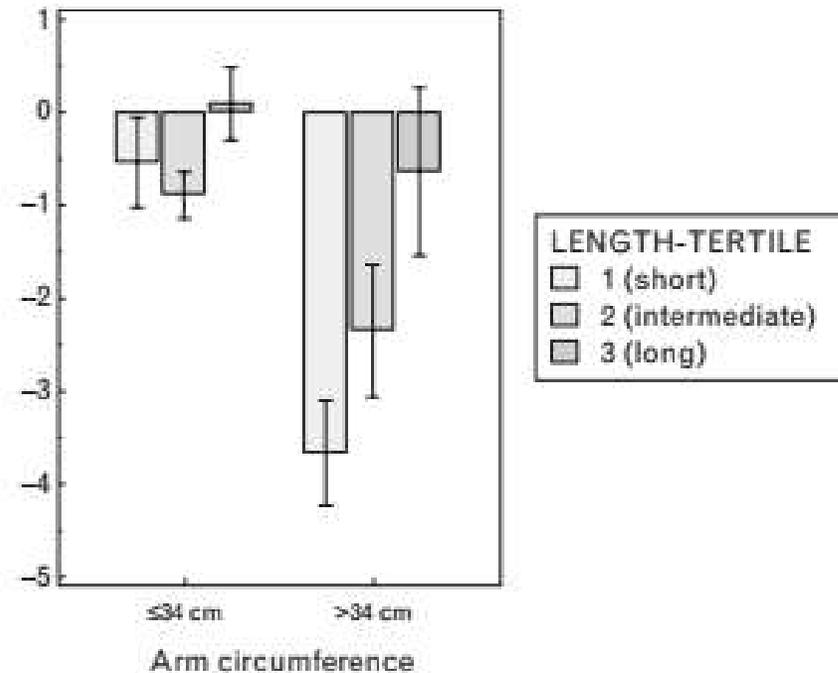# Brassard conique vs brassard cylindrique

FIGURE 3 SBP discrepancies between the tronco-conical and the cylindrical cuffs in the participants stratified by arm circumference and tertile of arm length. A negative value indicates that the cylindrical cuff measurement is greater than the tronco-conical cuff measurement. Data are mean ± SEM and are adjusted for age and sex. Results of two-way analysis of covariance: arm circumference, $F = 5.8$, $P = 0.003$; arm length, $F = 8.7$, $P = 0.003$; arm circumference × length, $F = 4.1$, $P = 0.017$.

Panoplie indispensable!

Mesure de la PA chez le patient hémodialysé

Comment?

Quand?

Table 2. Blood Pressure Measurement Recommendations Versus Usual Practice

| Guideline Recommendation	Usual Practice in the Hemodialysis Unit
Avoid caffeine, cigarettes, or exercise before measurement	Not routinely avoided—hemodialysis fits into the patient's daily routine
Measure on both arms for first reading	Not usually possible due to AV access; sometimes measured on lower limbs if AV access on both arms
Rest in quiet room for a few minutes	Quiet room for this purpose not part of hemodialysis unit design
Patient relaxed	Ability to be relaxed prior to fistula needling and hemodialysis varies from person to person
Average of at least 2 readings	Duplication to average readings is rarely done because of time constraints (although multiple readings occur throughout a hemodialysis session)

Abbreviation: AV, arteriovenous.
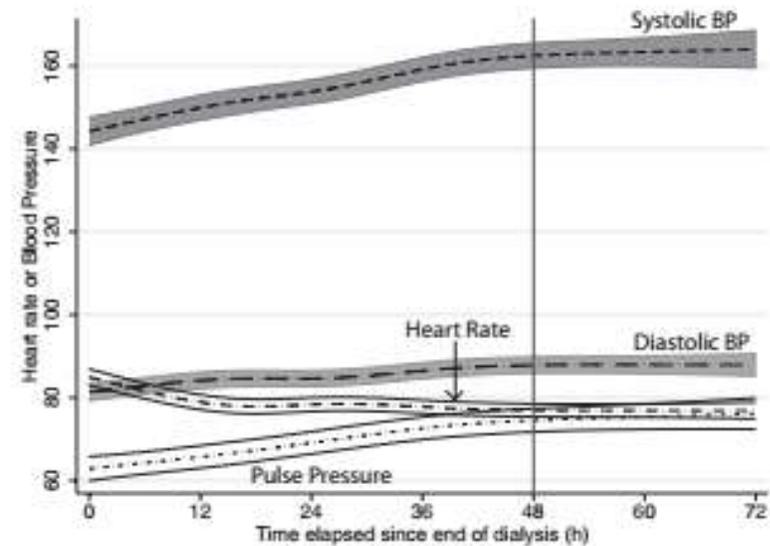
Figure 1. Changes in blood pressure (BP) and heart rate over time elapsed from the end of a hemodialysis session modelled using restricted cubic splines from multiple ambulatory measurements in 140 patients. Reproduced from Agarwal and Light[46] with permission of the National Kidney Foundation.

Quand prendre la PA chez le patient HD?

- MAPA
  - Gold standard
  - Idéalement sur 44h
- HBPM Inter dialyse
  - Forte corrélation avec MAPA/44h
  - Associée aux atteintes d'organes liées à l'HTA
- Pré dialyse
  - Associée à la prise de poids interdialytique
  - Faiblement corrélée à la MAPA/44h
  - Mauvais prédicteur de la mortalité
- Per dialyse
  - > PA pré et post dialyse pour dépister une HTA interdialytique
- Post dialyse
  - Faiblement corrélée à la MAPA/44h
  - Mauvais prédicteur de la mortalité
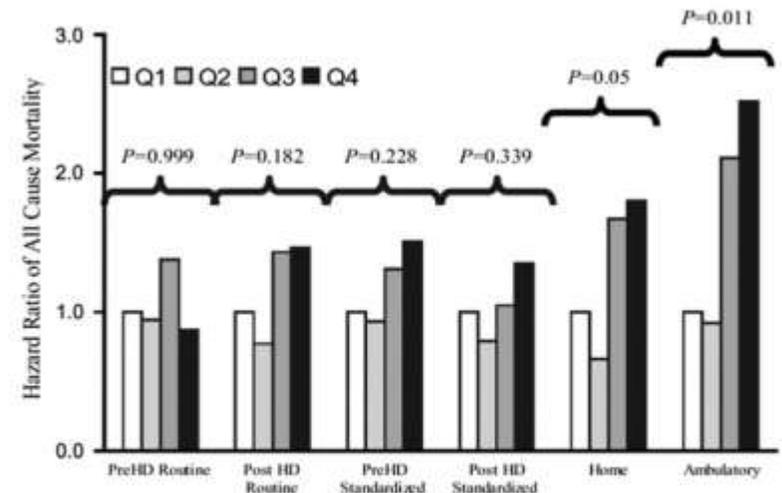
FIGURE 1: Hazard ratios for all-cause mortality for quartiles of pre-dialysis, post-dialysis, home and ambulatory systolic blood pressure (BP). Higher levels of home BP and ambulatory BP were significantly associated with mortality, whereas pre- and post-dialysis BP was not. P-values are those reported for linear trend. HD, haemodialysis; Q, quartile. Reproduced with permission from Alborzi *et al.* [3]

Recommandation ERA-ESH 2016

Box 1: Diagnosis of hypertension in dialysis patients

Hypertension in dialysis patients should be defined on the basis of home BP or ABPM measurements. Thresholds and methods proposed by the ASH/ASN [5], the EURECA-m working group of ERA-EDTA [11] and the relevant ESH Guidelines [24, 40, 41] can be used as follows:
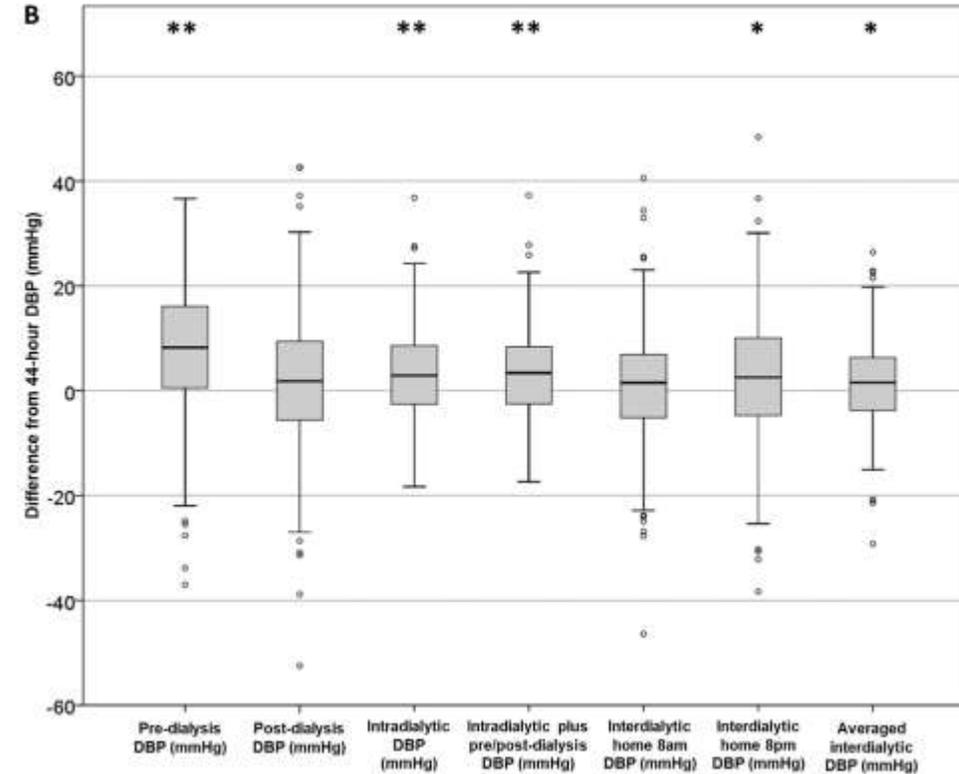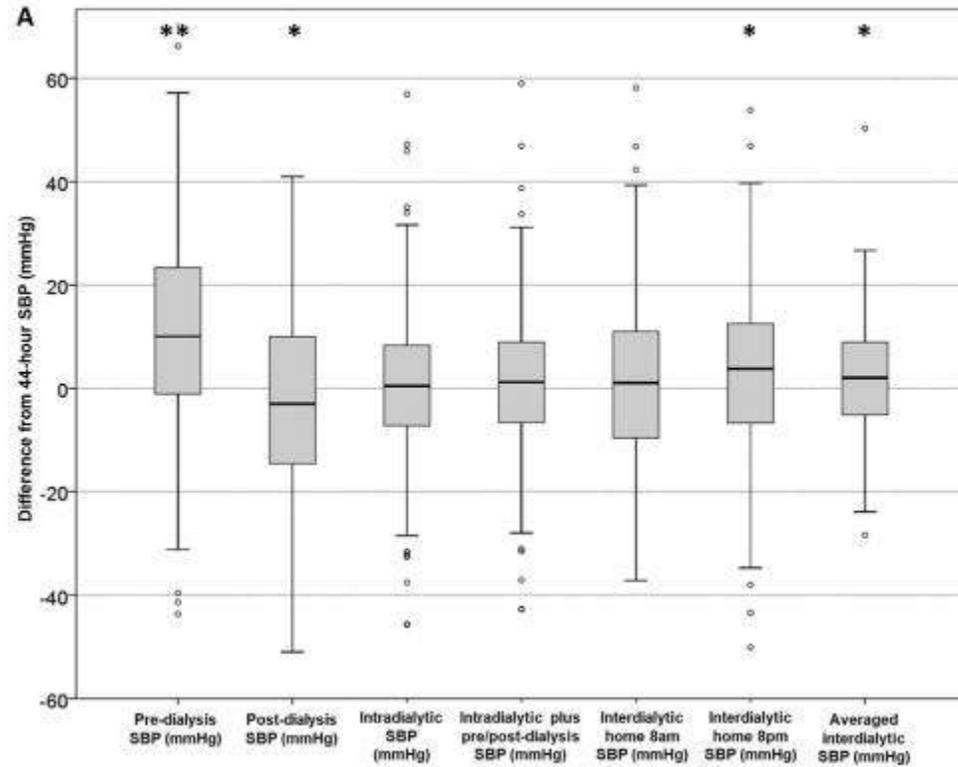
- Home BP in haemodialysis: an average BP ≥135/85 mmHg for measurements collected in the morning and in the evening over 6 non-dialysis days (covering a period of 2 weeks). Measures should be performed in a quiet room, with the patient in seated position, back and arm supported, after 5 min of rest and with two measurements per occasion taken 1–2 min apart.
- Home BP in peritoneal dialysis: an average BP ≥135/85 mmHg over 7 consecutive days with measurements collected as above.
- ABPM in haemodialysis: an average BP ≥130/80 mmHg over 24-h monitoring during a mid-week day free of haemodialysis. Whenever feasible, ABPM should be extended to 44 h, that is, covering a whole mid-week dialysis interval.
- ABPM in peritoneal dialysis: an average BP ≥130/80 mmHg over 24-h monitoring.

- For haemodialysis patients, no recommendation can be made on the basis of pre- or post-dialysis BP. When neither ABPM nor home BP measurements are available in these patients, the diagnosis can be made on the basis of office BP measurements taken in a mid-week day free of haemodialysis, that is, the average of three measurements with 1–2 min intervals obtained in the sitting position by trained personnel after at least 5 min of quiet rest. The threshold of office BP ≥140/90 mmHg recommended by current guidelines for the definition of hypertension in CKD patients can be used for haemodialysis patients.
- For peritoneal dialysis patients, office BP ≥140/90 mmHg obtained as described immediately above can be used for the diagnosis of hypertension.

Accuracy of Peridialytic, Intradialytic, and Scheduled Interdialytic Recordings in Detecting Elevated Ambulatory Blood Pressure in Hemodialysis Patients
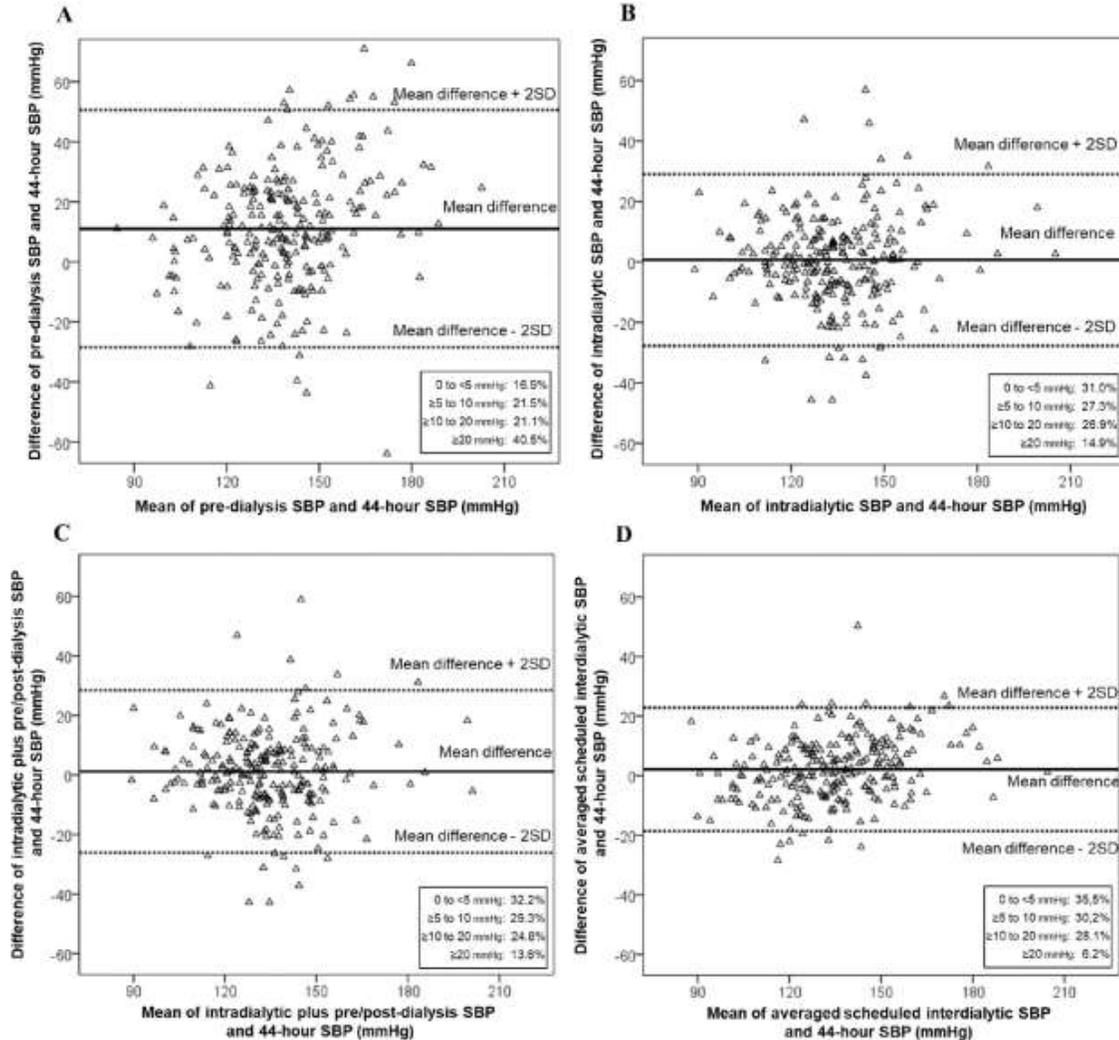
Pantelis Sarafidis, Marieta P. Theodorakopoulou, Charalampos Loutradis, Fotini Iatridi, Maria-Eleni Alexandrou, Antonios Karpetas, Georgios Koutroumpas, Vassilios Raptis, Charles J. Ferro, and Aikaterini Papagianni

Accuracy of Peridialytic, Intradialytic, and Scheduled Interdialytic Recordings in Detecting Elevated Ambulatory Blood Pressure in Hemodialysis Patients

Pantelis Sarafidis, Marieta P. Theodorakopoulou, Charalampos Loutradis, Fotini Iatridi, Maria-Eleni Alexandrou, Antonios Karpetas, Georgios Koutroumpas, Vassilios Raptis, Charles J. Ferro, and Aikaterini Papagianni

Accuracy of Peridialytic, Intradialytic, and Scheduled Interdialytic Recordings in Detecting Elevated Ambulatory Blood Pressure in Hemodialysis Patients

Background & Aims

ABPM

Gold standard for diagnosis and treatment of hypertension in hemodialysis

Aims: assess the agreement of peridialytic, intradialytic and scheduled interdialytic recordings with 44-h ABPM

Methods

242 hemodialysis patients with 48-h ABPM

- ABPM: reference standard

- Pre- and Post-dialysis, Intradialytic, Intradialytic plus pre/post-dialysis readings

- Scheduled interdialytic BP (out-of-dialysis day: readings at 8:00 am, 8:00 pm or their average)

Results

SBP	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	K-statistic
Pre-dialysis	86.5	38.6	66.3	67.2	0.27
Post-dialysis	63.1	73.3	76.7	58.7	0.35
Intradialytic	77.3	76.2	82.0	70.6	0.53
Intradialytic plus pre/post-dialysis	76.6	72.3	79.4	68.9	0.49
Averaged scheduled interdialytic	87.9	77.2	84.4	82.1	0.66

CONCLUSION: Intradialytic, intradialytic plus pre/post-dialysis, and scheduled interdialytic BP are promising approaches for detecting elevated 44-h ambulatory BP.

AJKD

Mesure de la PA au MI?

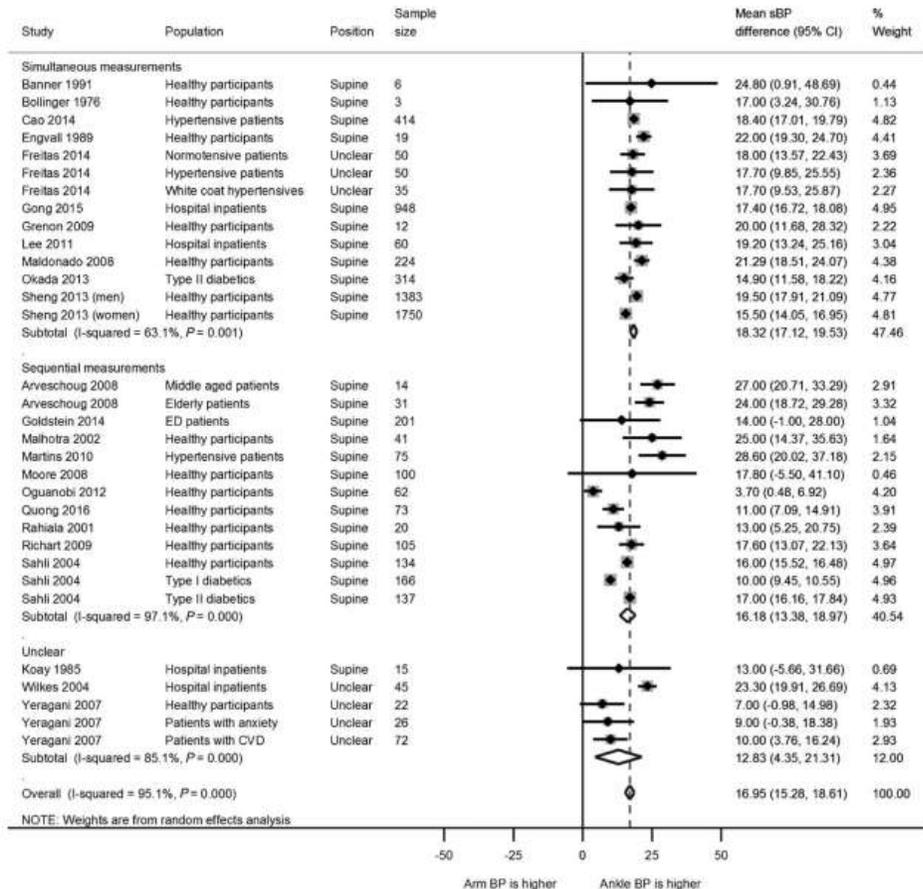# Mesure de la PA au membre inférieur

FIGURE 2 Arm–ankle SBP difference in the general population (n = 24 studies). Mean SBP difference given in mmHg. BP, blood pressure; CI, confidence interval; CVD, cardiovascular disease; ED, emergency department.
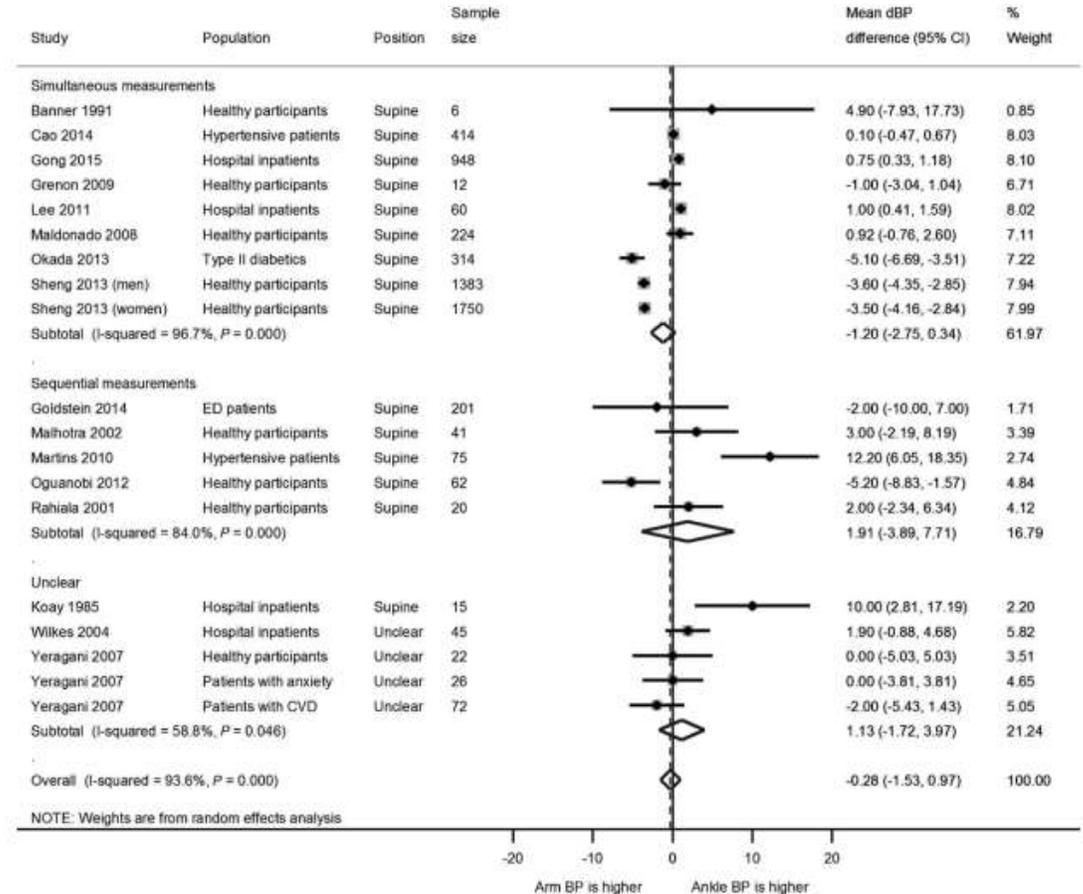
FIGURE 3 Arm–ankle DBP difference in the general population (n = 16 studies). Mean DBP difference given in mmHg. BP, blood pressure; CI, confidence interval; CVD, cardiovascular disease; ED, emergency department.

Journal of Hypertension 2019, 37:660–670
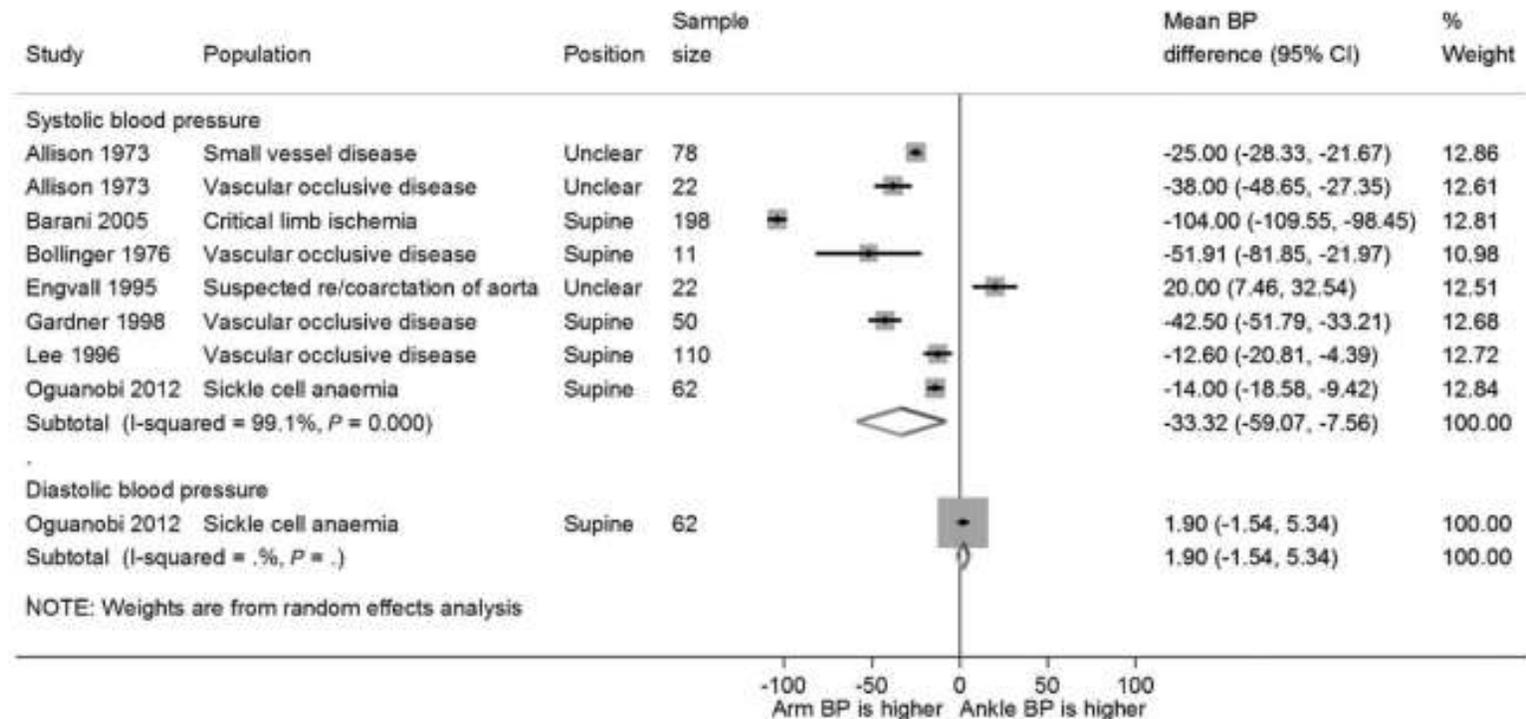
Mesure de la PA au membre inférieur

FIGURE 4 Arm–ankle blood pressure difference in patients with a history of cardiovascular disease (n=7 studies). Mean BP difference given in mmHg. BP, blood pressure; CI, confidence interval.