Modifications des propriétés de rigidité artérielle dans le SED vasculaire

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Ultrafast Ultrasound Imaging with conventional vascular probe

25 - 50 Hz

Conventional US

time

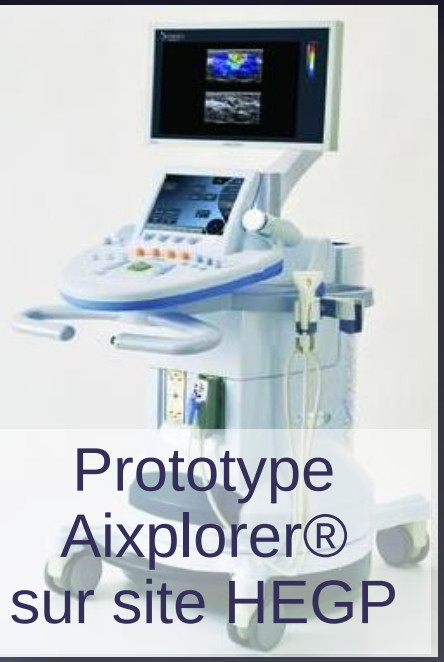
0 s

1 s

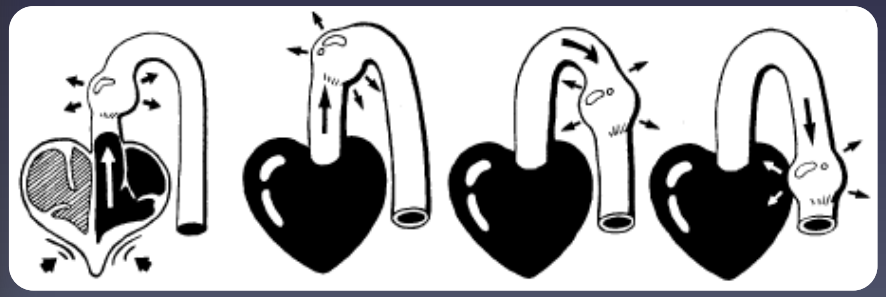
Ultrafast US

A 30 ms Experiment !!

5000 – 10000 Hz



Prototype Aixplorer® sur site HEGP



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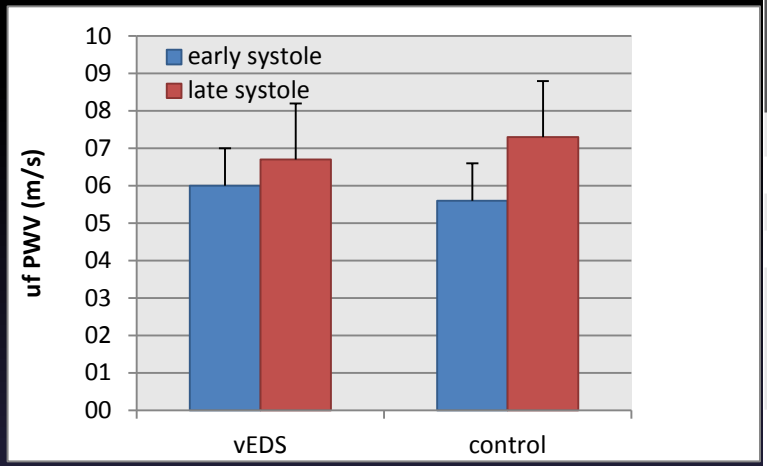
Carotid stiffness change over the cardiac cycle by ultrafast ultrasound imaging in healthy volunteers and vascular Ehlers–Danlos syndrome

Tristan Mirault[a,b,*], Mathieu Pernot[c,d,*], Michael Frank[b,e], Mathieu Couade[c,d], Ralph Niarra[e], Michel Azizi[e], Joseph Emmerich[a,b], Xavier Jeunemaître[b], Mathias Fink[c,d], Mickaël Tanter[c,d], and Emmanuel Messas[a,b]

Journal of Hypertension 2015, 33:1890–1896



All ages n = 102	
PWV	
cfPWV (m/s)	7.6 ± 1.7
ufPWV early systole (m/s)	5.6 ± 1.2
ufPWV end systole (m/s)	7.3 ± 2.0
ΔPWV/PPc (m/s/mmHg)	0.057 ± 0.048
ΔPWV/PPp (m/s/mmHg)	0.039 ± 0.033

n = 37	Mean ± standard deviation	*P* value	*P** value
Gender female, n (%)	26 (70.3)	0.0534	
Age (year)	38.6 ± 13.5	0.0384	
Weight (kg)	59.2 ± 11.7	<0.0001	
BMI (kg/m^2)	22.0 ± 3.5	0.0008	
Peripheral blood pressures			
SBP (mmHg)	122.5 ± 11.4	0.8163	
DBP (mmHg)	69.7 ± 8.4	0.6144	
Pulse pressure (mmHg)	52.8 ± 7.2	0.8512	
Central blood pressures			
SBP (mmHg)	108.5 ± 15.8	0.8210	
DBP (mmHg)	70.3 ± 9.7	0.9995	
Pulse pressure (mmHg)	38.3 ± 8.3	0.7408	
Heart rate (bpm)	67.4 ± 10.8	0.0603	
PWV			
cfPWV (m/s)	7.9 ± 1.4	0.3508	0.0028
ufPWV early systole (m/s)	6.0 ± 1.5	0.0580	0.1069
ufPWV end systole (m/s)	6.7 ± 1.5	0.0759	0.0424
ΔPWV/PPc (m/s/mmHg)	0.021 ± 0.046	0.0010	0.0035
ΔPWV/PPp (m/s/mmHg)	0.014 ± 0.031	0.0018	0.0014

P value from comparison with control values. *P**, *P* value adjusted on age and weight; cfPWV, carotid-femoral pulse wave velocity; PPc, central pulse pressure; PPp, peripheral pulse pressure; ufPWV, ultrafast ultrasound imaging pulse wave velocity; ΔPWV, difference between ufPWV end systole and ufPWV early systole.

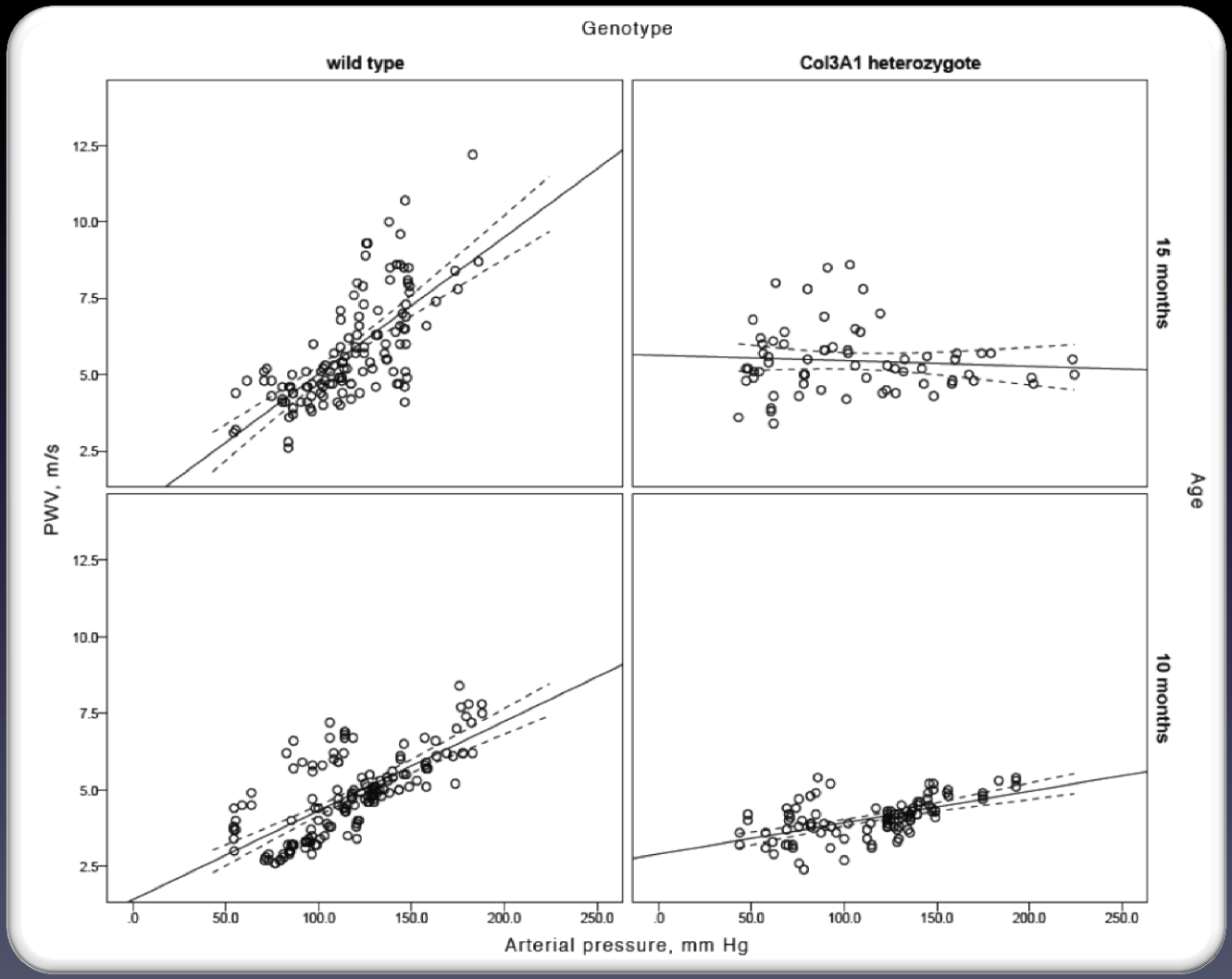
- Rigidité comparable
  mais
- Défaut de rigidification au cours du cycle cardiaque

Mirault et al. J Hypertens 2015

Étude UltrafastEcho – souris col3a1 hétérozygotes

Rigidification = f(âge; col 3a1)

La rigidification augmente avec l'âge, et est moindre chez les col3a1+/-



Pente = rigidification

Conclusion

Moindre rigidification à l'augmentation de pression artérielle

- SEDv humains
  - Moindre rigidification de la paroi artérielle au cours du cycle cardiaque
- souris col3a1 hétérozygotes
  - Réponse altérée à l'augmentation de pression

→ suivi prospectif chez les SEDv: nouveau biomarqueur?
→ souris col3a1 KI Gly183Arg