KT DROIT GAUCHE ?
(ET OUI CA EXISTE ET VOILA POURQUOI!)

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PHYSIODAY 2024

HCL
HOSPICES CIVILS
DE LYON

QUELLE RÉACTION AVEZ-VOUS QUAND VOUS DÉCOUVREZ UN KT DROIT GAUCHE AU PROGRAMME A 18H ?

- Génial

- Ok

- Mince, je suis à la bourre encore 5 patients derrière

- Ça va être compliqué la double tête de pression avec les IDE!

- Ça existe encore ?

- Quelle est l'indication, est-ce pertinent ?

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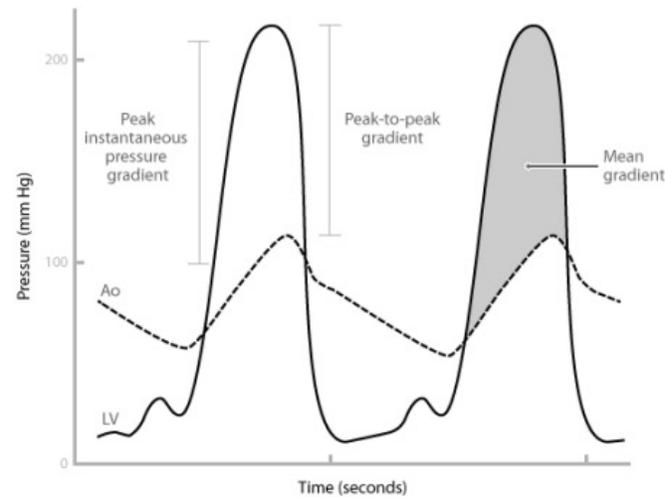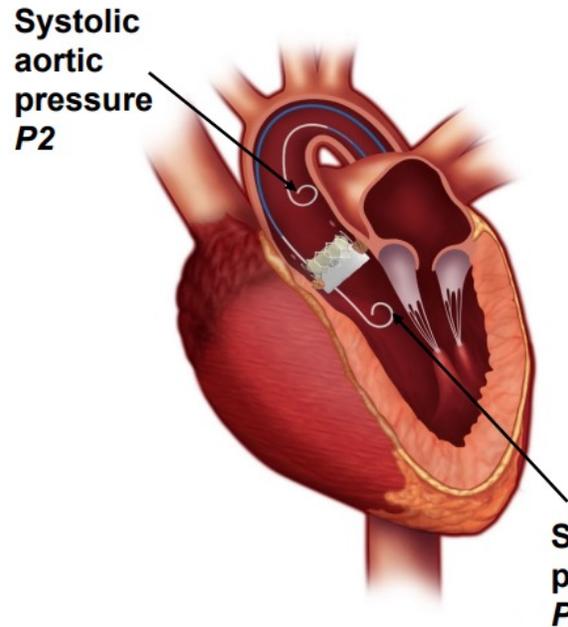- Quelle est l'indication, est-ce pertinent ?

POURQUOI FAUT-IL TOUJOURS EN FAIRE AUJOURD'HUI ?

- Malgré les progrès de l'ETT/ETO et de l'imagerie, intérêt
  - Dans les valvulopathies
    - Données cliniques/Echo/imagerie discordantes
    - Errance diagnostique
    - Polyvalvulopathies
  - Dans les cardiopathies
    - Diagnostique différentiel CMHO
    - Phénotype Hémodynamique des patient IC
    - Insuffisances cardiaques droites, PCC vs CMR
  - Cardiopathies congénitales
  - Dans l'évaluation des HTAP
  - Dégénérescence de TAVI
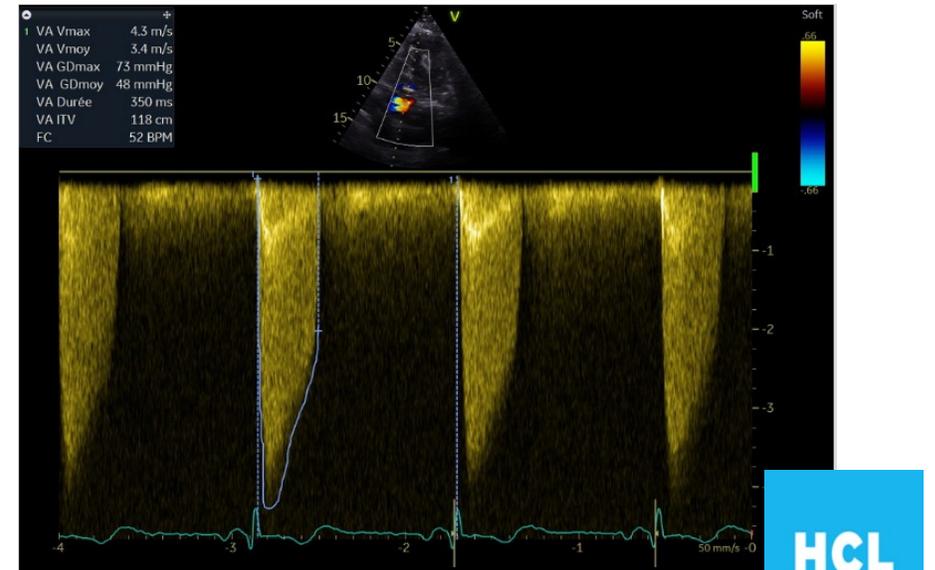   - Surestimation systématique du gradient écho

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Mean Aortic Gradient

Measured = Invasive
- Catheterization
- **Pressure** measurement

Systolic aortic pressure *P2*

Systolic LV pressure *P1*

Peak instantaneous pressure gradient

Peak-to-peak gradient

Mean gradient

Ao

LV

Pressure (mm Hg)

Time (seconds)

Estimated = Non-invasive
- Trans Thoracic Echocardiography
- **Velocity** measurement (Bernouilli formula)

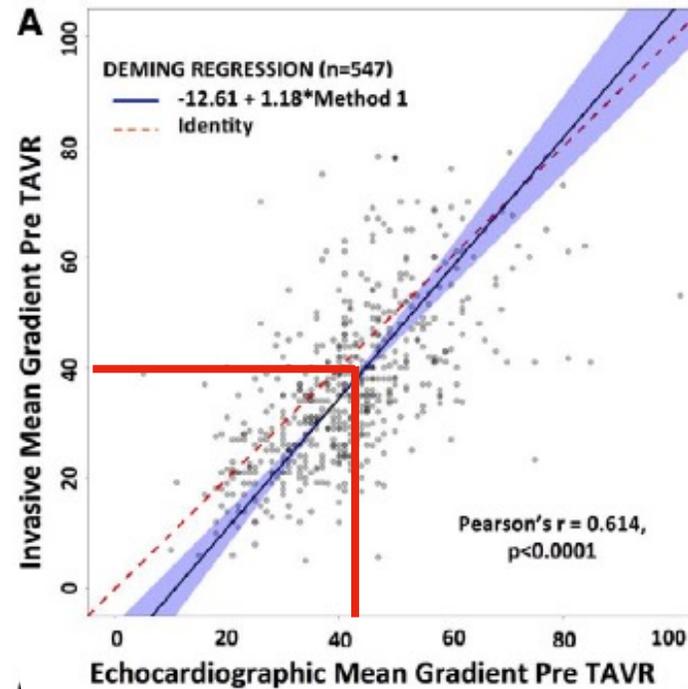| VA Vmax | 4.3 m/s |
VA Vmoy	3.4 m/s
VA GDmax	73 mmHg
VA GDmoy	48 mmHg
VA Durée	350 ms
VA ITV	118 cm
FC	52 BPM

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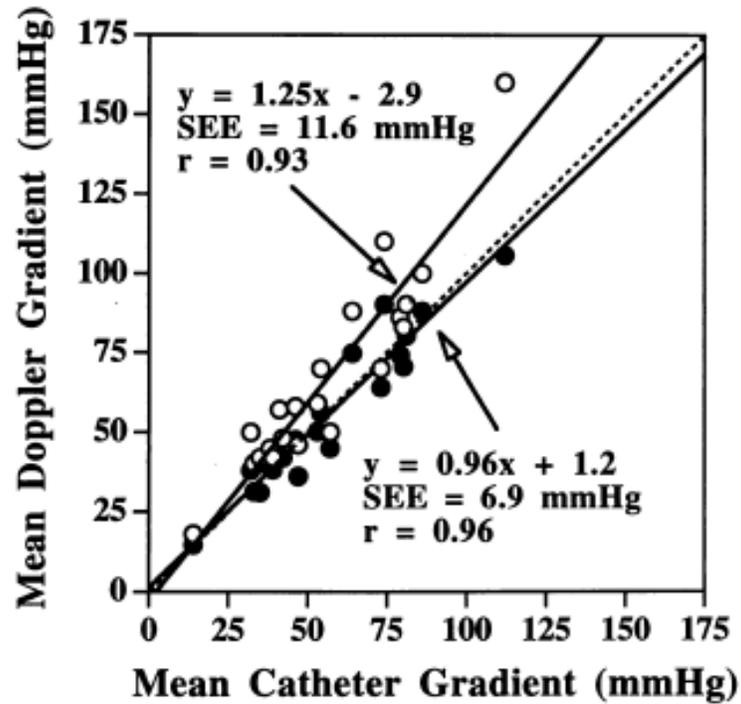# Mean Aortic Gradient
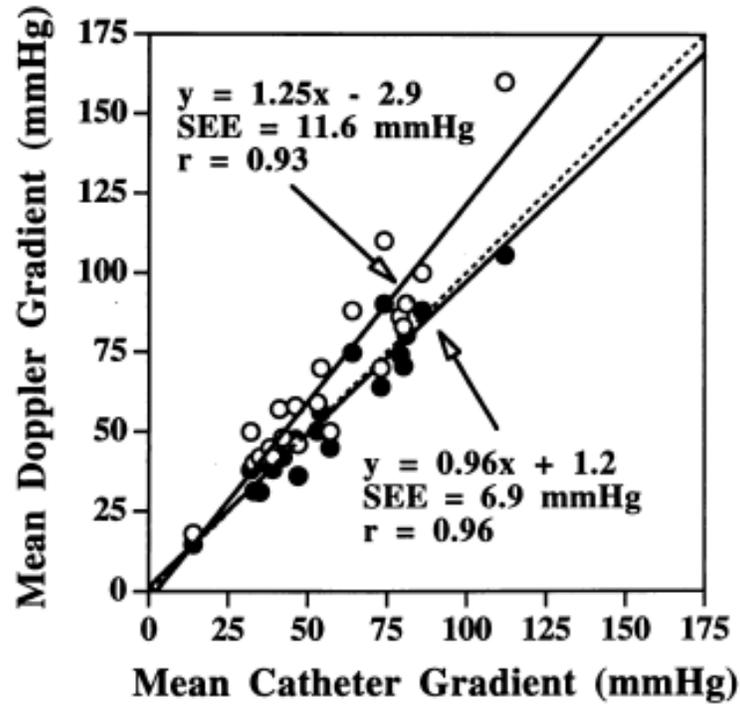
Before TAVI
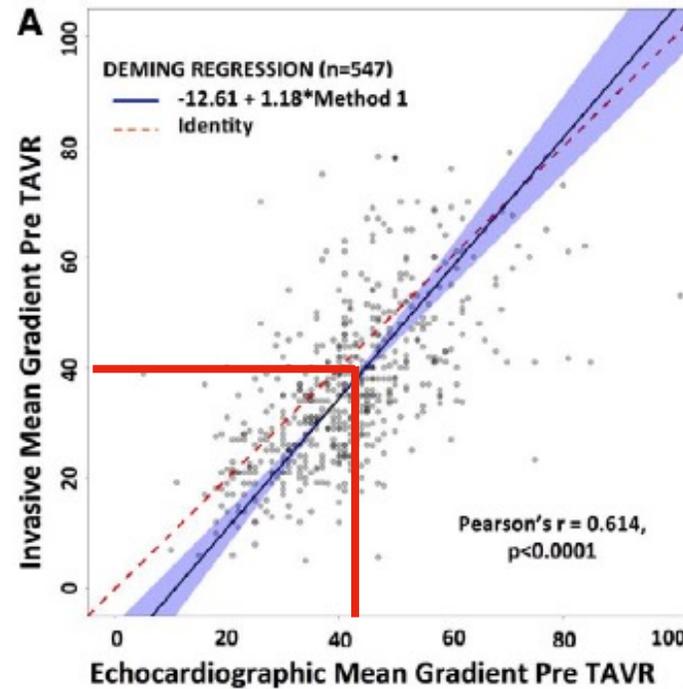

Baumgartner JACC 1999

Abbas JAHA 2021
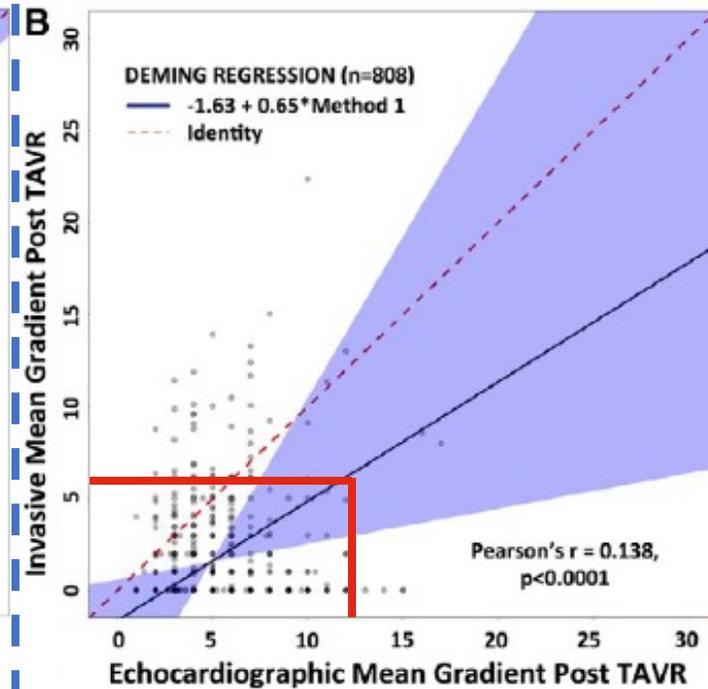
Mean Aortic Gradient

Before TAVI

After TAVI

Baumgartner JACC 1999

Abbas JAHA 2021

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Mean Aortic Gradient

Overestimted after TAVI TTE

Bernoulli law limits

$$\Delta P = 4V^2$$

Energy per unit volume before = Energy per unit volume after

$$P_1 + \tfrac{1}{2}\rho v_1^2 + \rho g h_1 = P_2 + \tfrac{1}{2}\rho v_2^2 + \rho g h_2$$

Pressure Energy | Kinetic Energy per unit volume | Potential Energy per unit volume

The often cited example of the Bernoulli Equation or "Bernoulli Effect" is the reduction in pressure which occurs when the fluid speed increases.

Flow velocity V_1

Flow velocity V_2

$A_2 < A_1$
$v_2 > v_1$
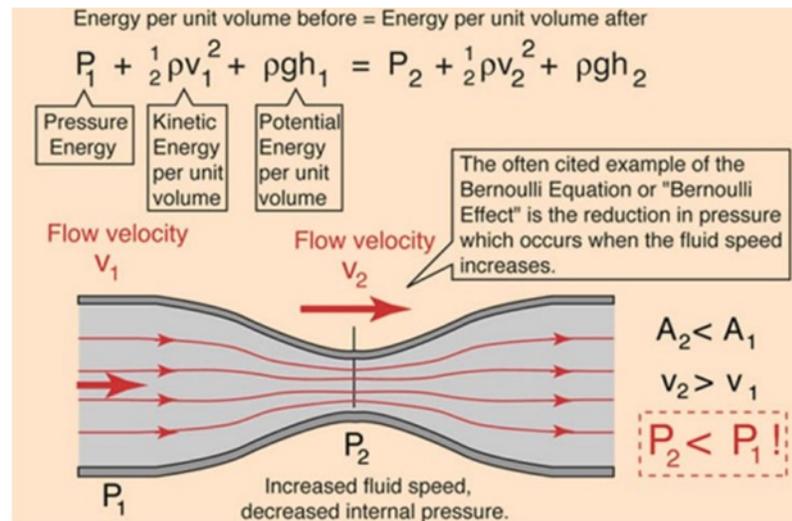$P_2 < P_1$!

P_1

P_2

Increased fluid speed, decreased internal pressure.

Review of Hydrodynamic Principles for the Cardiologist: Applications to the Study of Blood Flow and Jets by Imaging Techniques

AJIT P. YOGANATHAN, PhD, EDWARD G. CAPE, BS, HSING-WEN SUNG, PhD, FRANK P. WILLIAMS, PhD, ABDUL JIMOH, MS

JACC 1988

When does the simplified Bernoulli equation "not work"? (i.e., $\Delta P_{peak} = 4V_{2,\ peak}^2$). 1) When the proximal velocity is of the same order of magnitude as the distal velocity (1–3). Examples are: a) aortic regurgitation in combination with aortic stenosis; and b) prosthetic heart valves. Note, that a 1 to 2 m/s proximal velocity leads to a 4 to 16 mm Hg decrease in pressure gradient. In such cases use equation 3, that is, the Bernoulli equation.

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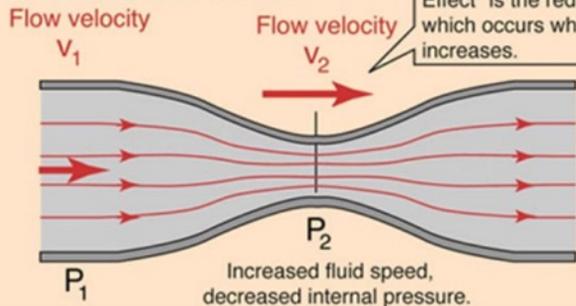
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Table 5 Doppler parameters of prosthetic valves in the aortic valve position

	Normal	Possible stenosis	Suggests significant stenosis
TAVI (change from baseline)			
Mean gradient[†]	Change <10 mm Hg from baseline[†]	Increase of 10-19 mm Hg from baseline	Increase ≥20 mm Hg from baseline
DVI[§¶]	Change <0.1 or 20% from baseline[‖]	Decrease 0.1-0.19 or 20%-39% from baseline[‖]	Decrease ≥0.2 or ≥40% from baseline[‖]
EOA[§]	Change <0.3 cm² or 25% from baseline[‖]	Decrease of 0.3-0.59 cm² or 25%-49% from baseline[‖]	Decrease ≥0.6 cm² or ≥50% from baseline[‖]

Zoghbi JASE 2024

CE QUE VOUS ALLEZ VOIR A PHYSIODAY !

- **Valvulopathies** Léo Cuenin

- **HTAP**

- **RA/CM0** Pierre Amiens et Pierre Meyer

- **HTAP** Baptiste Mossaz

- **Phénotypage du patient insuffisant cardiaque** Lamis Haider