

Le risque rénal du structurel chez le sujet âgé

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In the last year , I received research grants or speaker fees or I am/was consultant for: Abbott Vascular, Biotronik, Colibri, Cordis, Medtronic, Terumo. I am currently minor shareholder & general director of CERC (CRO)

Quel risque?

Impact sur la mortalité

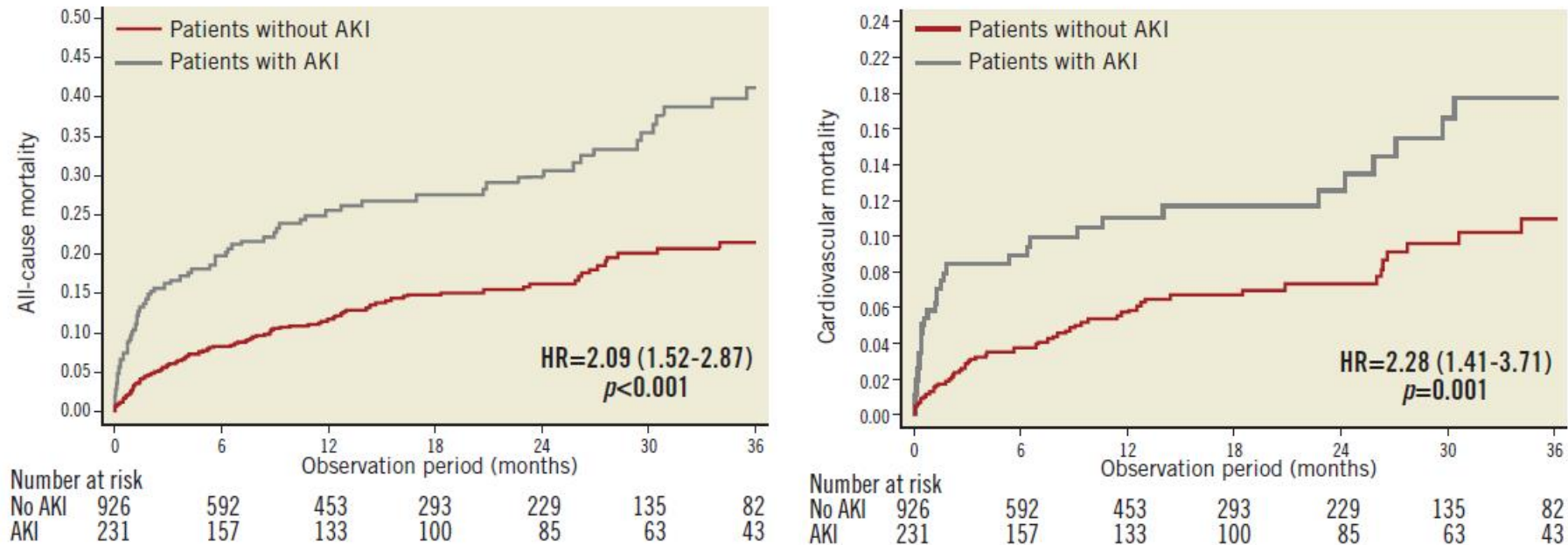


Figure 2. Kaplan-Meier curves showing cumulative and cardiovascular mortality rates through three years. Comparison of the cumulative (A) and cardiovascular (B) death rates through three years in patients with AKI compared with patients without AKI. Adjusted HRs (95% CI) are reported.

Identifier le risque

VARC 2

Table 6. Acute kidney injury (AKIN classification*)

| |
|--|
| <p>Stage 1 Increase in serum creatinine to 150-199% (1.5-1.99 × increase compared with baseline) OR increase of ≥0.3 mg/dL (≥26.4 mmol/L) OR Urine output <0.5 ml/kg per hour for >6 but <12 hours</p> |
| <p>Stage 2 Increase in serum creatinine to 200-299% (2.0-2.99 × increase compared with baseline) OR Urine output <0.5 ml/kg per hour for >12 but <24 hours</p> |
| <p>Stage 3[†] Increase in serum creatinine to ≥300% (>3 × increase compared with baseline) OR serum creatinine of ≥4.0 mg/dL (≥354 mmol/L) with an acute increase of at least 0.5 mg/dL (44 mmol/L) OR Urine output <0.3 ml/kg per hour for ≥24 hours OR Anuria for ≥12 hours</p> |
| <p>The increase in creatinine must occur within 48 hours; *Mehta et al.³¹ [†] Patients receiving renal replacement therapy are considered to meet Stage 3 criteria irrespective of other criteria</p> |

Comprendre le risque

Facteurs prédictifs

Non modifiables

Fonction rénale de base

Diabète / Polyvasculaire

Insuffisance cardiaque

FE

Modifiables

Volume de contraste

Injections multiples à moins de 3j
d'interavlle

Instabilité hémodynamique

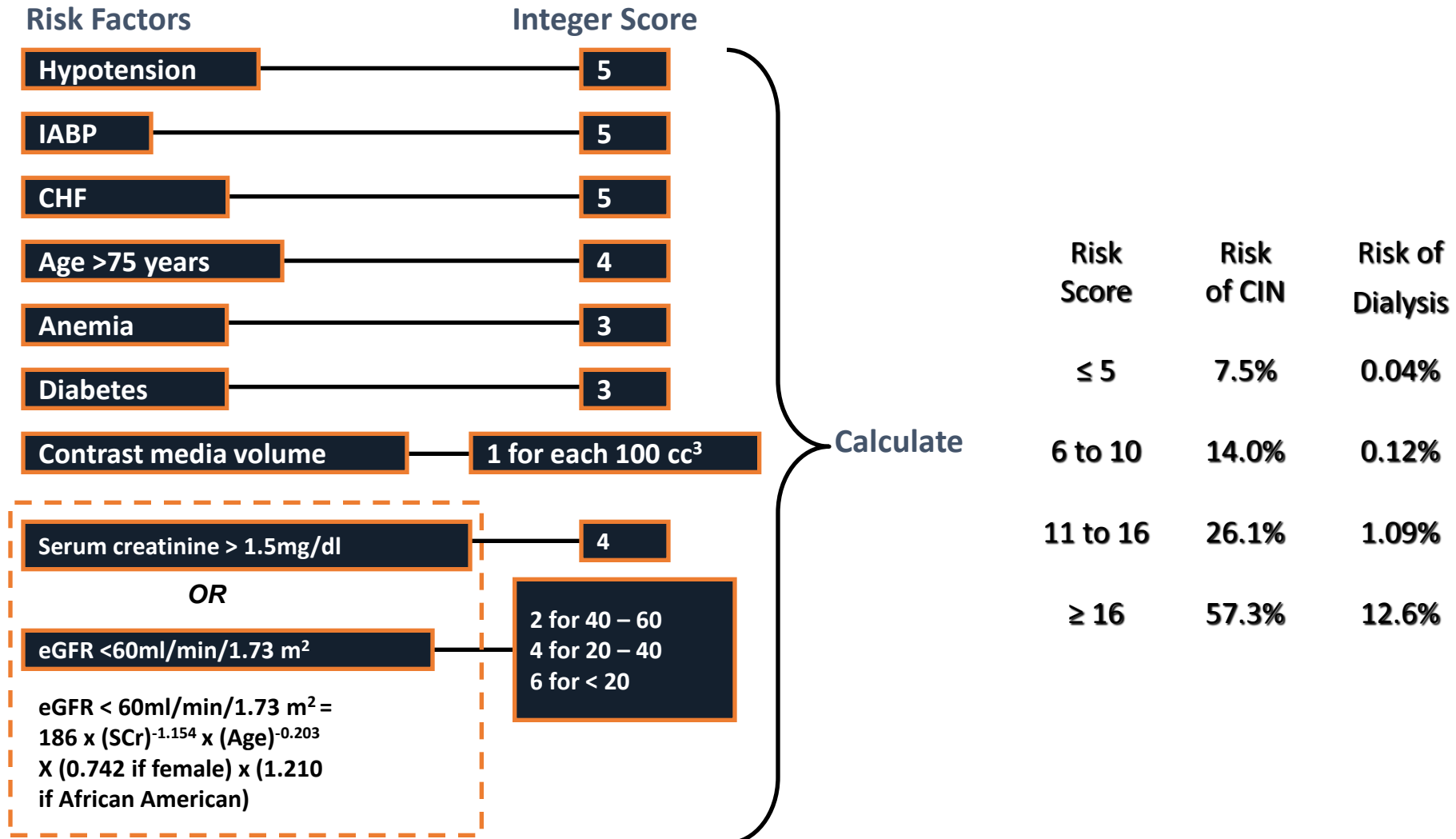
Déshydratation

IEC / Diurétiques

Anémie

Médicaments néphrotoxiques
(AINS, Antibiotiques)

Mehran Score

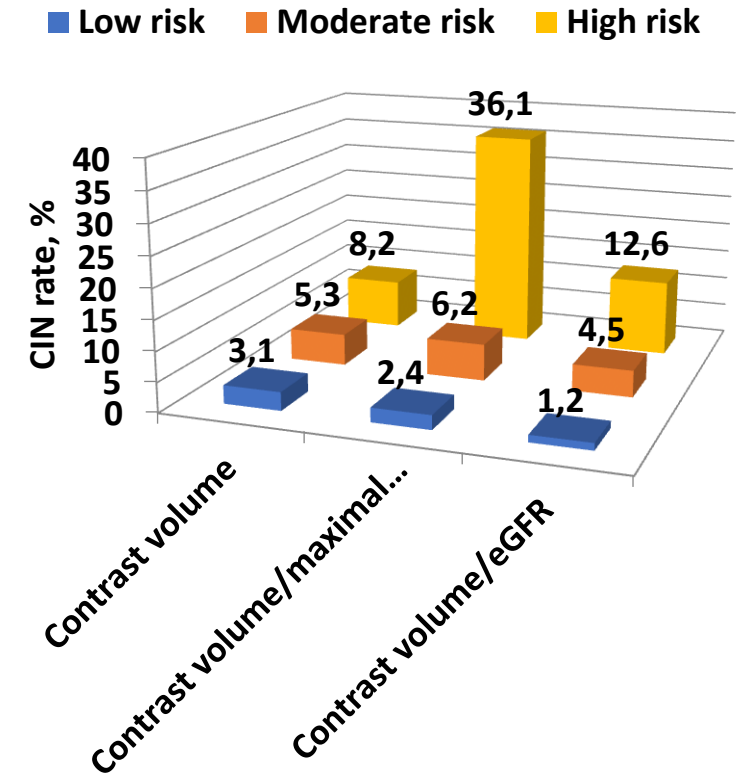


Prévenir le risque

- Prévenir et traiter immédiatement les complications hémorragiques
- Gérer le contraste pendant le screening et durant la procédure
- Gérer l'hydratation

Gérer le contraste

- Calculer la clairance Cockcroft ou MDRD
- Définir la dose maximale d'injection unique
 - 4 x clairance
- Considérer la dilution du contraste

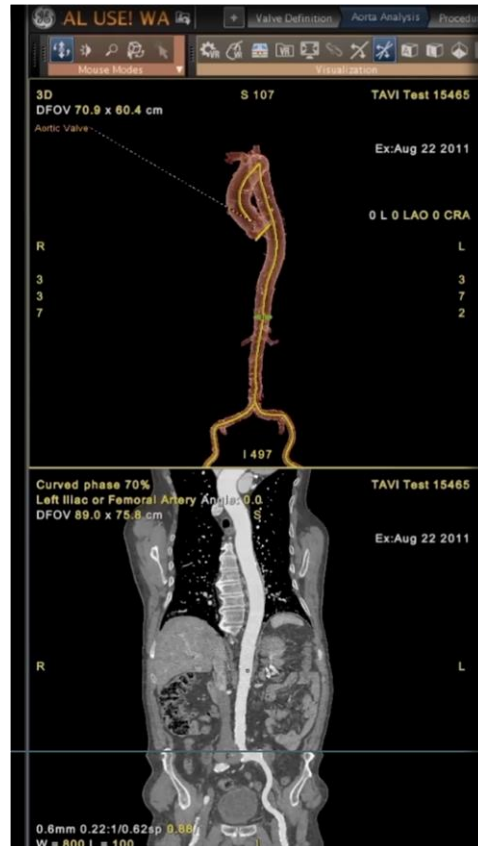


Screening adapté

- Eviter enchainement scanner-coro-TAVI.
- 72h d'intervalle entre chaque examen puis TAVI à distance (5 jours).
- Hydratation avant et après chaque examen iodé.

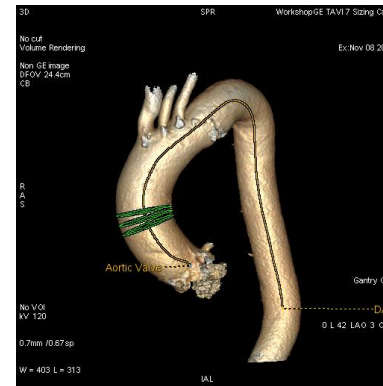
SCANNER: Quel option d'acquisition?

OPTION 1



90-100 cc

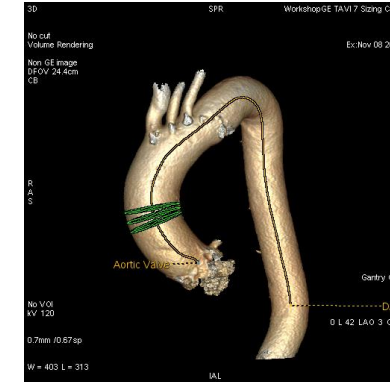
OPTION 2



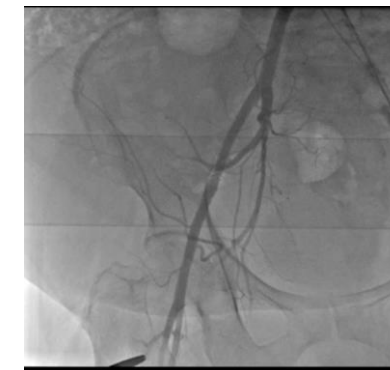
+



OU



+



50 cc

8-10 cc

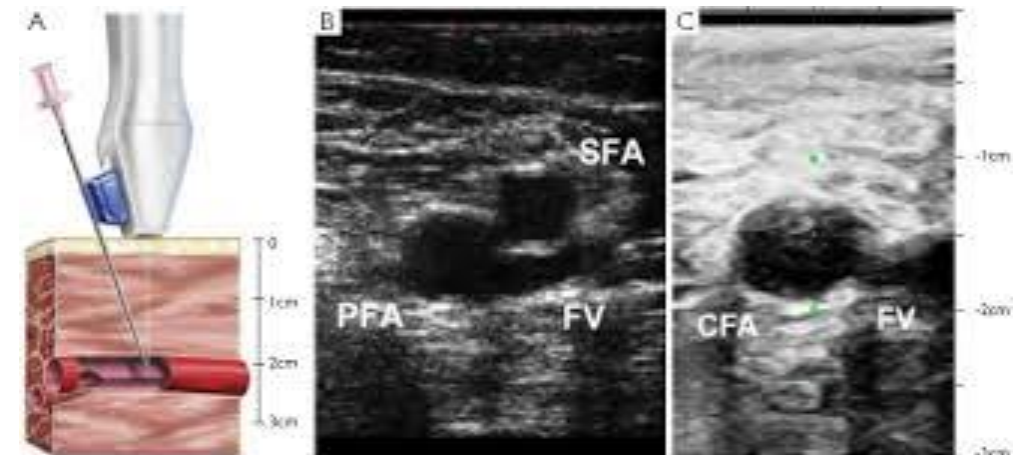
Comment « économiser » le contraste

Ponction « sous angio »



10-15 cc

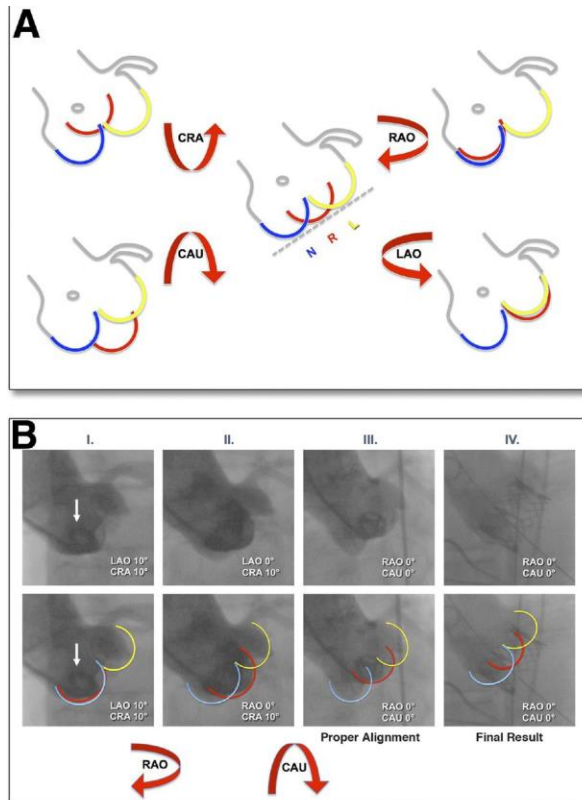
Ponction sous écho



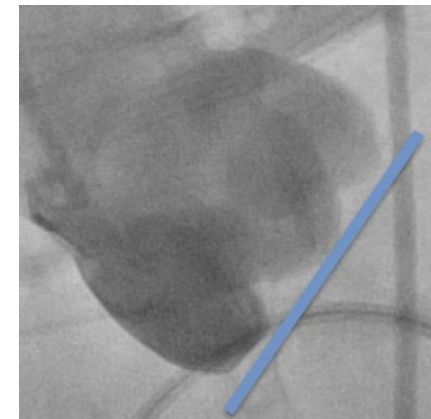
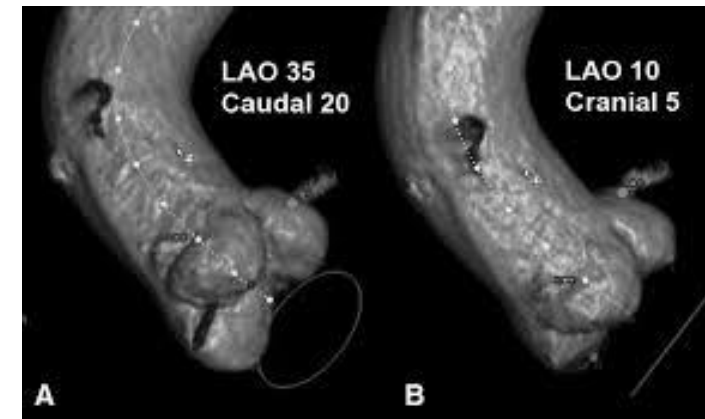
Aortographie (6-7ml/sec, 12-14cc).

Recherche incidence par aortographie

- OAG 15 – CRA 15
- Puis incidences adaptées

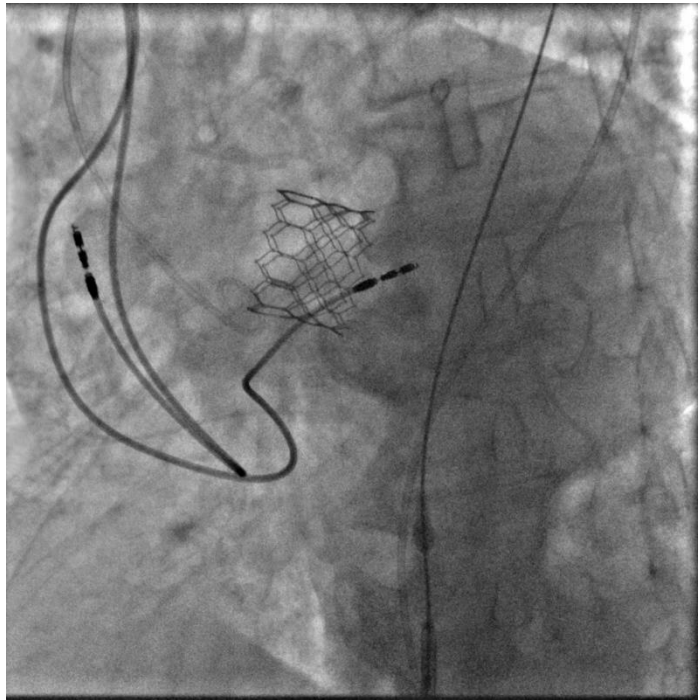


Incidence donnée par scanner



Contrôle final

**Aortographie 15-20cc à 10 ml/sec sans
guide**

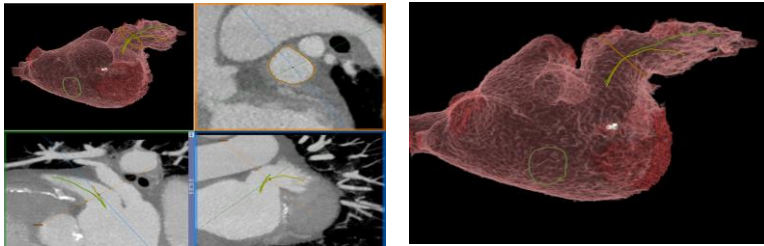


Echographie si possible ++



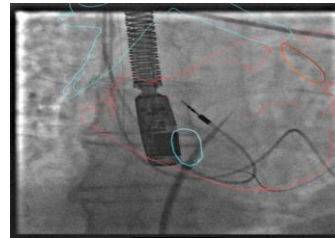
MSCT fusion - Workflow

1/ CT planning

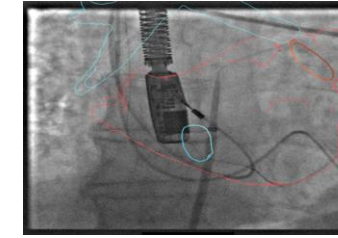


Device sizing, planning line and working view for deployment

2/ Guide transeptal puncture

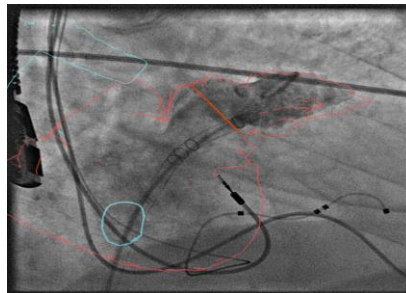


1st registration in AP view based on bronchus carina

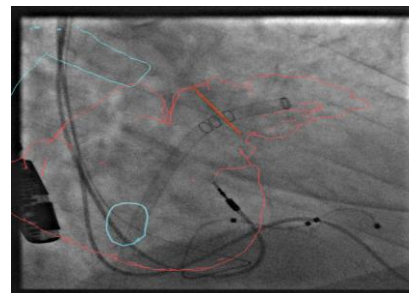


Use the planning line of the fossa ovalis to guide the puncture together with TEE

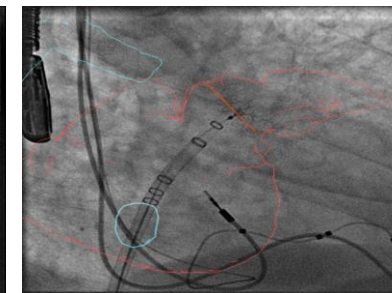
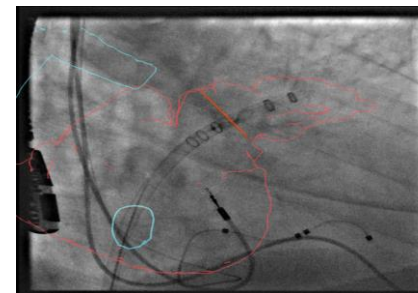
3/ guide and assess deployment of closure device



2nd registration based on pigtail injection in the LAA in implant projection



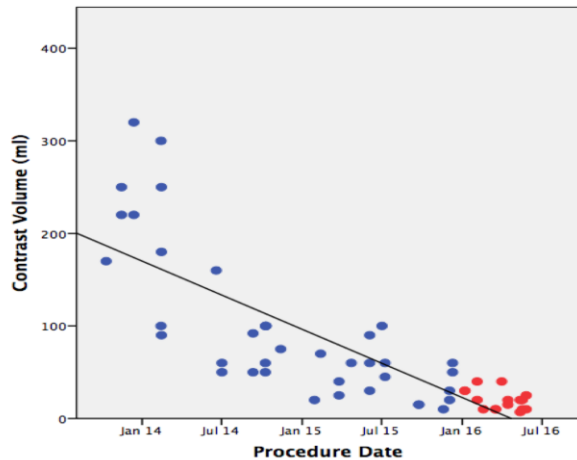
Deployment guided by LAA contour and the landing zone planning line overlay. Final assessment performed with TEE



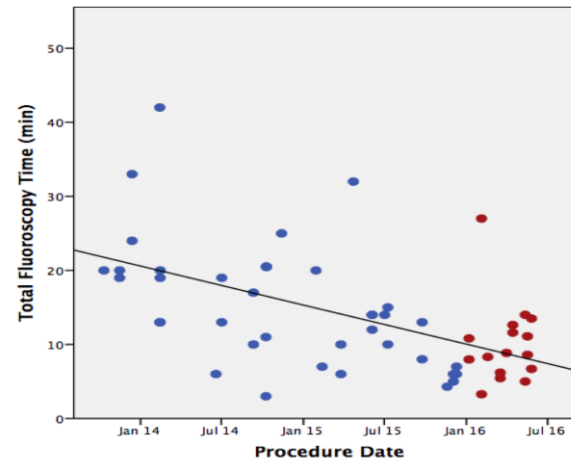
MSCT fusion – ICPS experience

| | Prefusion | Fusion | P-value |
|--|-----------|------------|---------|
| Device embolization (%) | 0 (0.0) | 0 (0.0) | 1.00 |
| Cardiac tamponade | 0 (0.0) | 0 (0.0) | 1.00 |
| Cardiac death | 0 (0.0) | 0 (0.0) | 1.00 |
| In hospital death | 0 (0.0) | 0 (0.0) | 1.00 |
| Incomplete LAA sealing (as verified by transesophageal echocardiography) | 6 (14.6) | 0 (0.0) | 0.16 |
| Successful implantation | 38 (92.7) | 16 (100.0) | 0.17 |

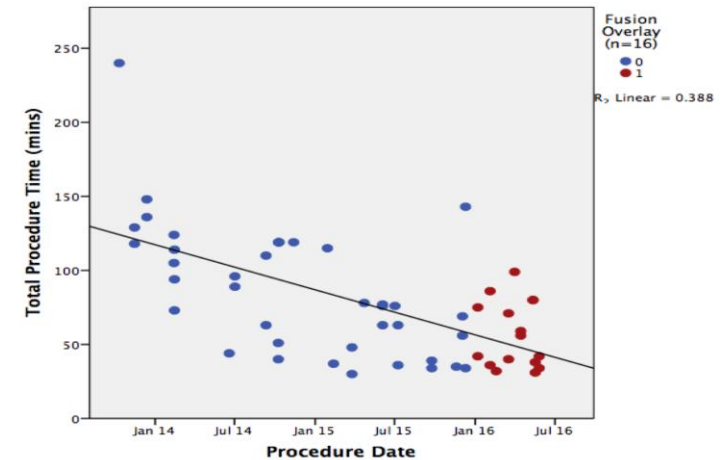
95 vs 21 cc (p<0.05)



8.3 vs 6.2 min (p<0.05)



87 vs 63 min (p<0.05)

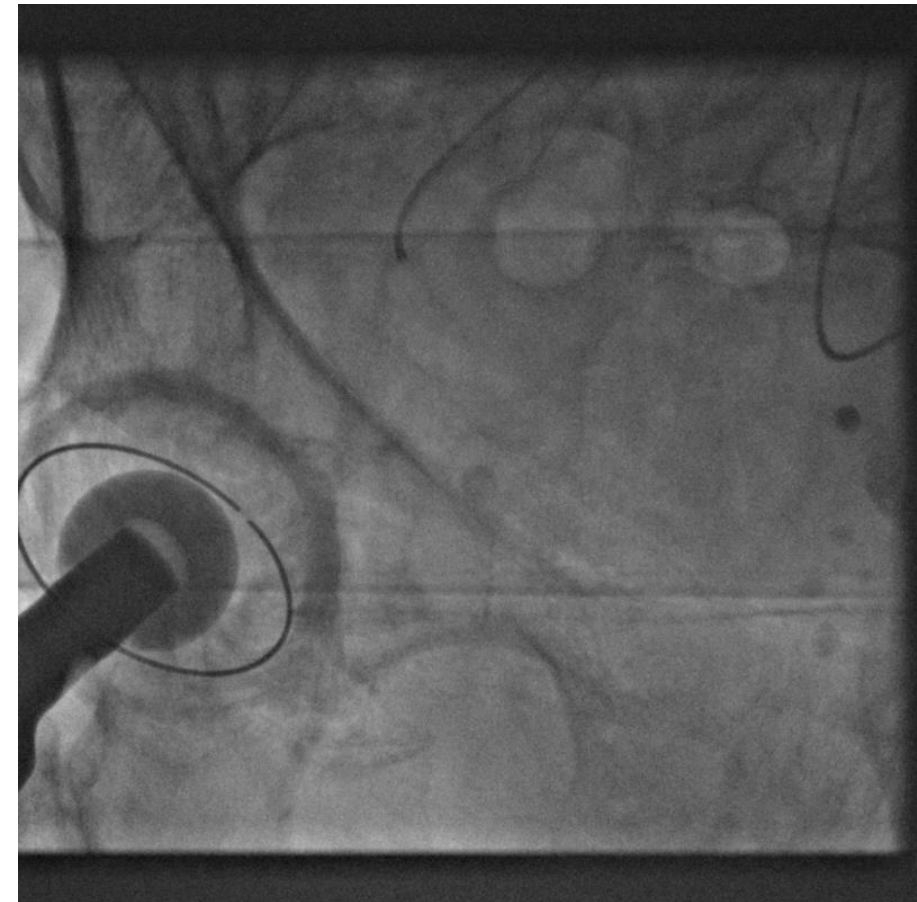
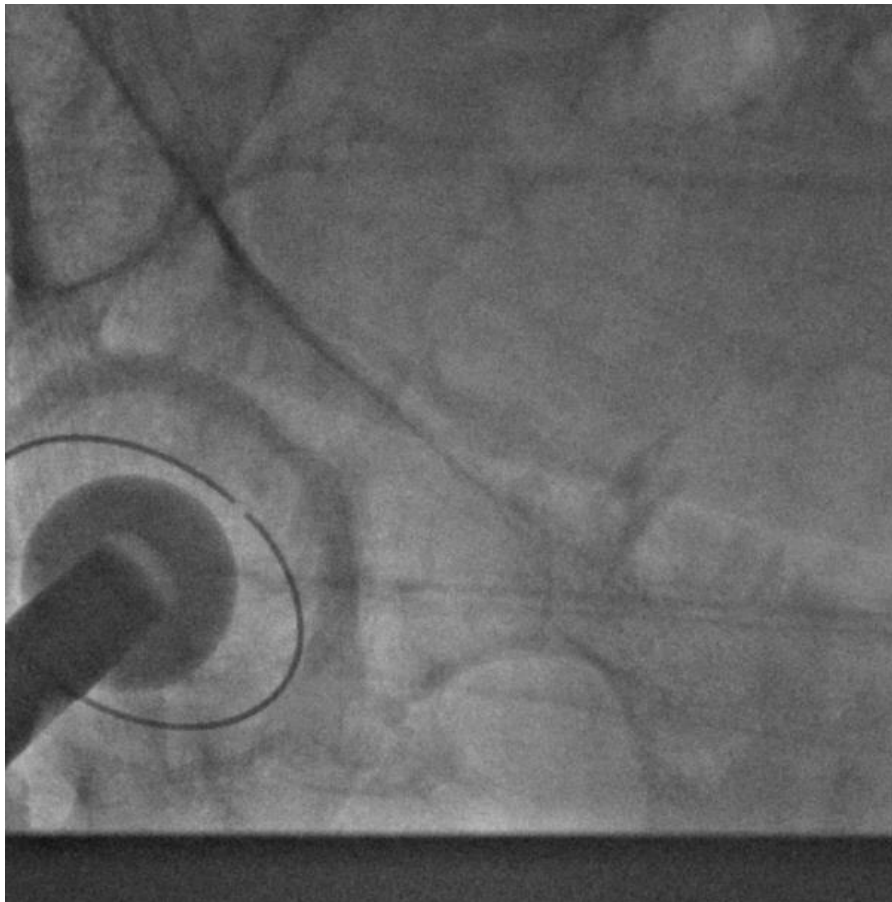


Roy et al, CCI, 2017

Injecter peu mais injecter bien!

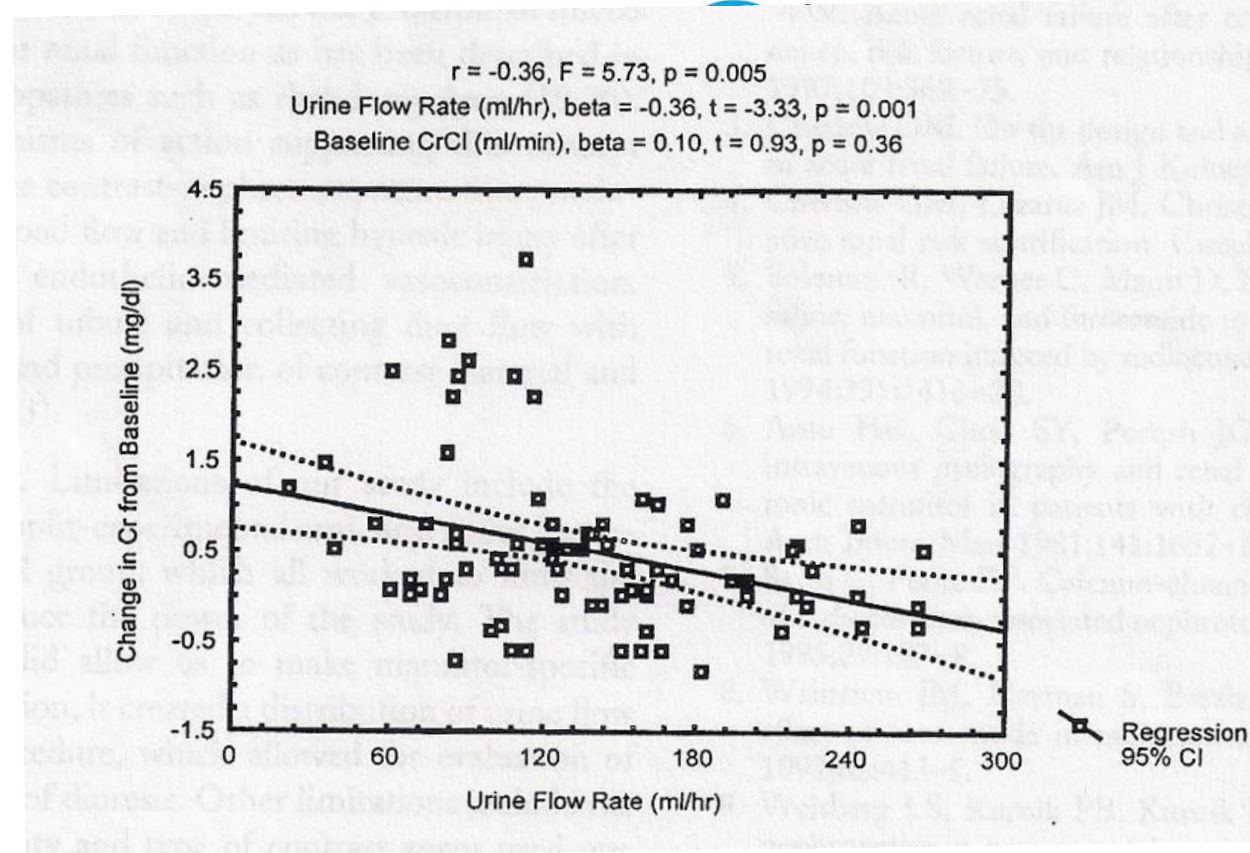
Injection non sélective

10 cc



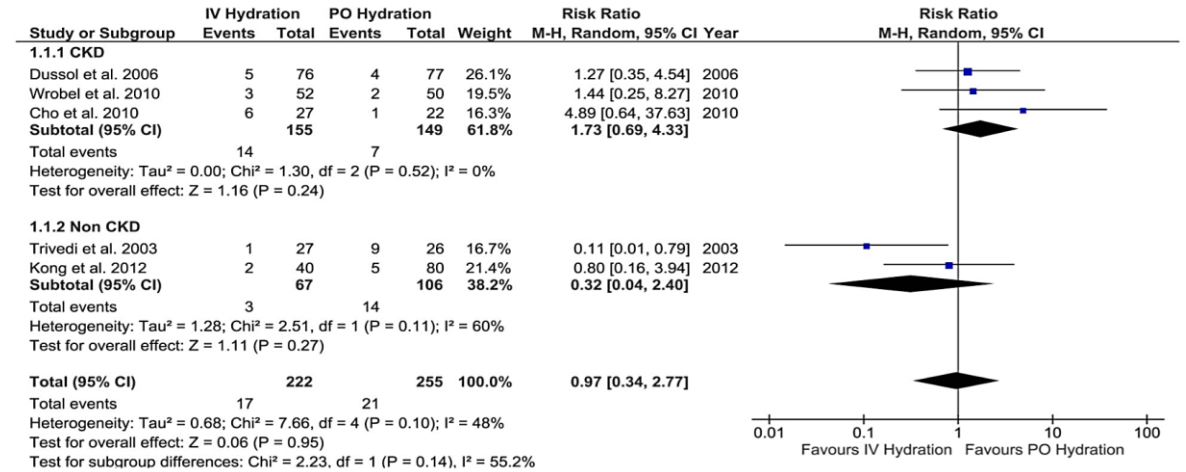
Gérer l'hydratation

- Comment cela marche?
 - Corrige l'hypovolémie (ETT)
 - Agit au niveau rénal
 - Dilue le contraste intra-rénal
 - Limite la toxicité directe par contact
 - Diminue la viscosité intrarénale



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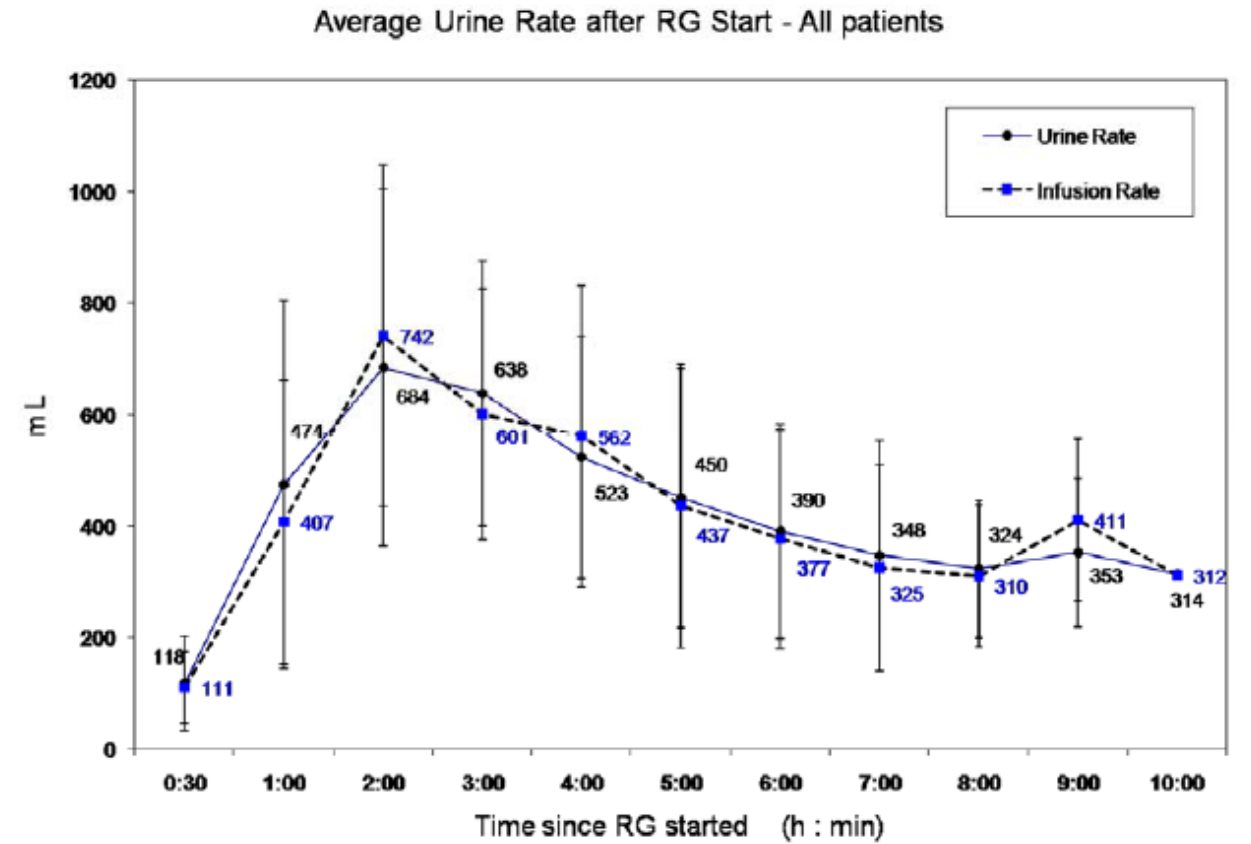
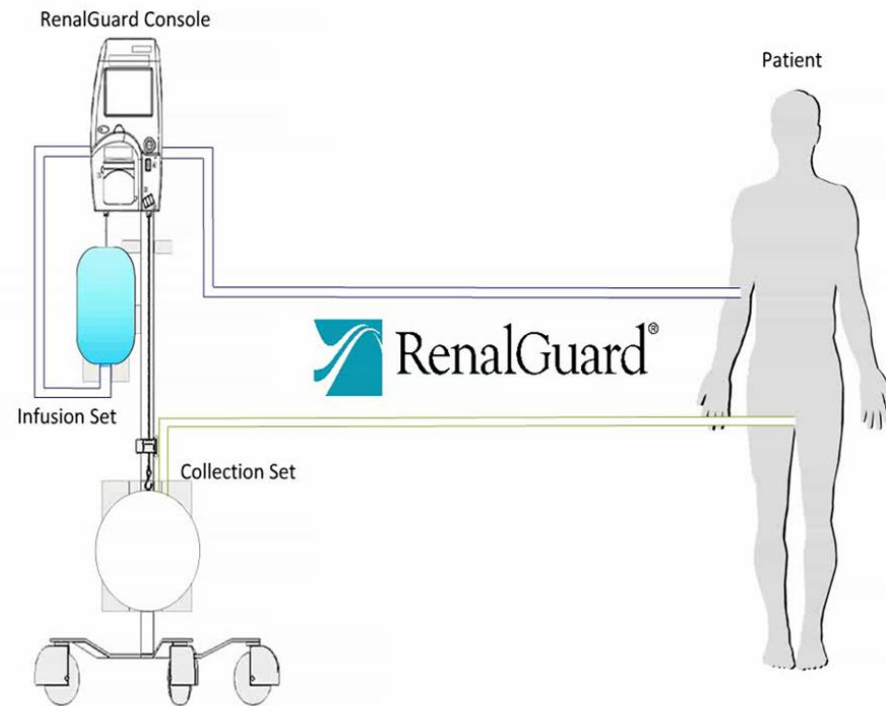


- Ne pas négliger l'hydratation orale du sujet âgé



- Hydratation IV 3ml/kg/h 1h avant 6h après
- Pas d'avantage net Bicarbonate > Serum salé

RenalGuard



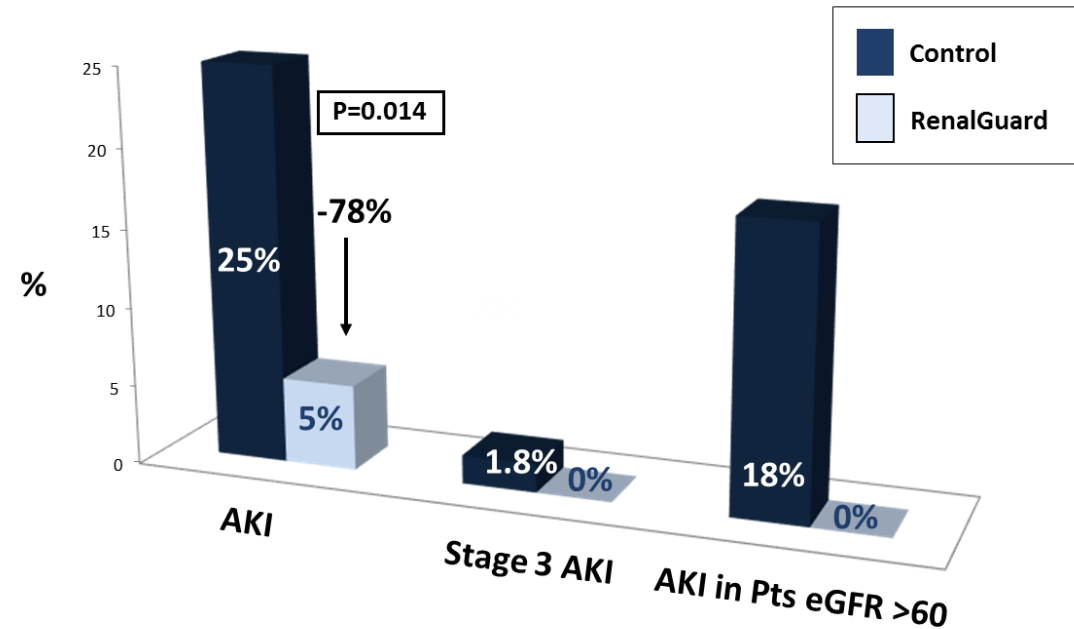
MYTHOS/REMEDIAL II/AKIGUARD/PROTECT-TAVI

Patients

- N=112 TAVI patients

Design

- RenalGuard vs. Overnight hydration
- Primary endpoint: CI-AKI



Results

- CI-AKI Reduced 78% (p=0.014)
- In patients without pre-existing kidney dysfunction, CI-AKI reduced from 18% to 0 %.

European Society of Cardiology (ESC) and the European Association for Cardio-Thoracic Surgery (EACTS)¹

2014 Guidelines:

Recommendations for prevention of contrast-induced nephropathy

| Recommendations | Dose | Class ^a | Level ^b | Ref ^c |
|--|---|--------------------|--------------------|------------------|
| Patients with moderate-to-severe CKD | | | | |
| Furosemide with matched hydration may be considered over standard hydration in patients at very high risk for CIN or in cases where prophylactic hydration before the procedure cannot be accomplished. | Initial 250ml intravenous bolus of normal saline over 30 min (reduced to ≤150 mL in case of LV dysfunction) followed by an i.v. Bolus (0.25-0.5mg/kg) of furosemide. Hydration infusion rate has to be adjusted to replace the patient's urine output. When the rate of urine output is >300 mL/h, patients undergo the coronary procedure. Matched fluid replacement maintained during the procedure and for 4 hours post-treatment. | IIb | A | 403.404 |

¹Windecker S, et al. 2014 ESC/EACTS Guidelines on myocardial revascularization. *Eur Heart J*. 2014.

⁴⁰³ Marenzi et al. *JACC Cardiovasc Interv*. 2012;5(1):90-7.

⁴⁰⁴ Briguori et al. *Circulation* 2011;124(11):1260-9.

RENALGUARD

- Madame L, juillet 2018
 - 78 ans, créatinine 178, clearance 24
 - Coro+Axes et scanner le même jour sous renalguard - 106 ml -
 - Créatinine à J3: 133, clearance 34
 - TAVI J4 sous renalguard -108 ml -
 - Créatininémie à 72h post-TAVI: 103 , clearance 45



Conclusion: injecter peu, hydrater bien...

- Prévenir l'IRA est un enjeu pour le pronostic des patients bénéficiant d'une procédure structurelle
- Le risque rénal doit être pris en compte dès le début du screening (rôle de la planification et de l'hydratation)
- L'utilisation de l'échographie et/ou de la fusion limite les injections de contraste
- L'utilisation du RENALGUARD semble prometteuse lorsque la fonction rénale est déjà (très) altérée