# CT PERFUSION

Pr Gilles Barone-Rochette
Interventional cardiology and cardiac imaging
Pôle Thorax et vaisseaux- CHU de Grenoble
Inserm 1039

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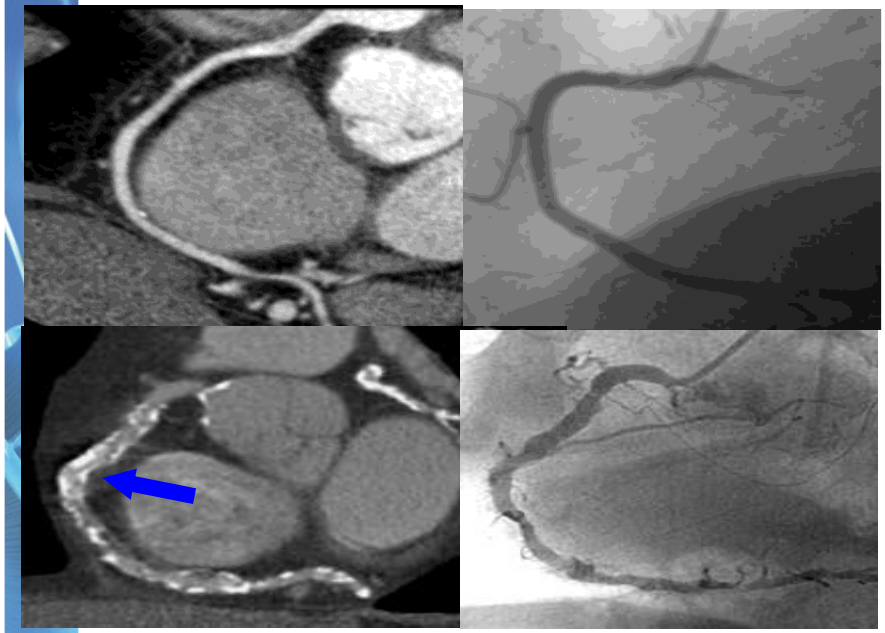
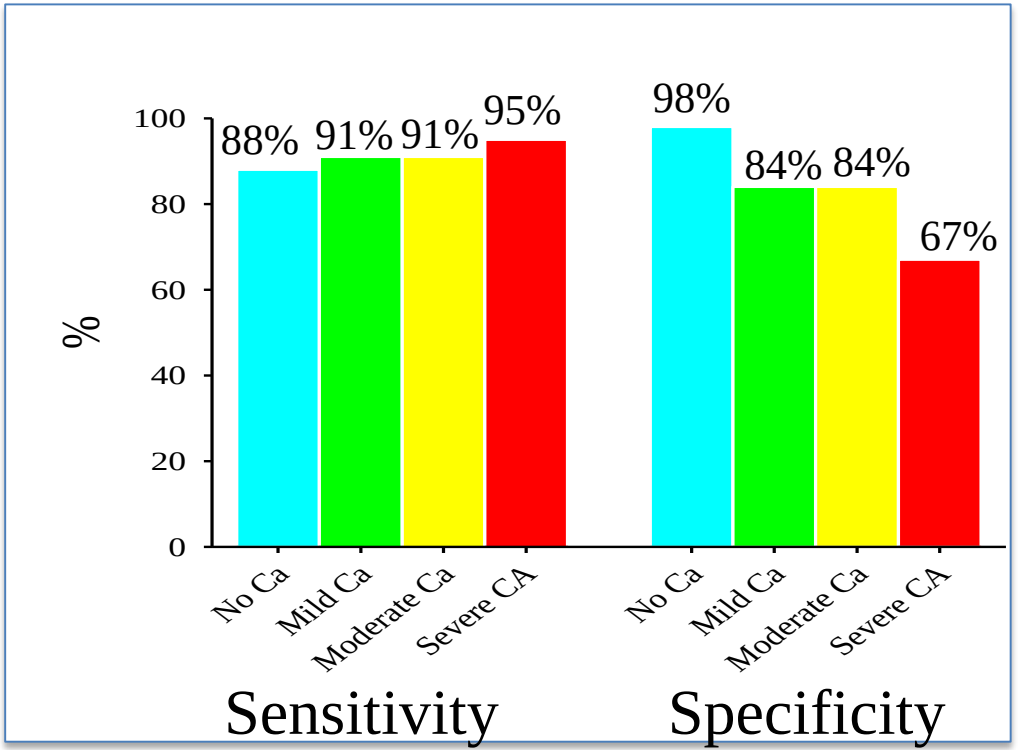
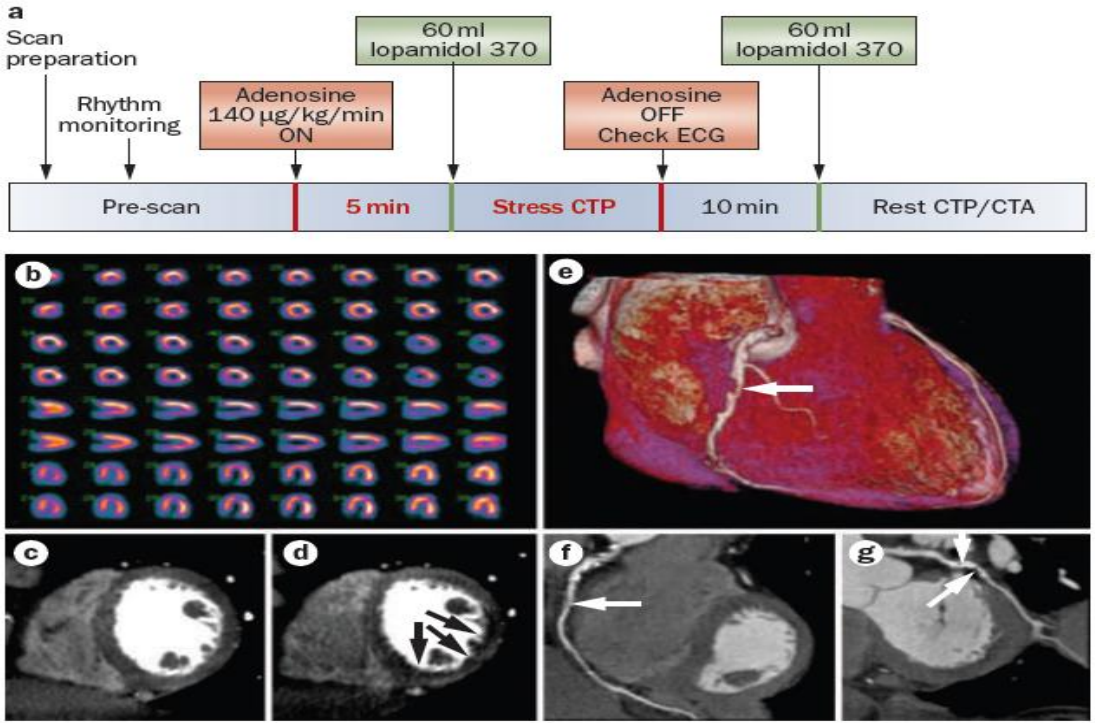
**Grenoble**

# MDCT Limitations Calcium



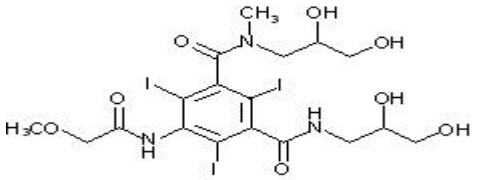


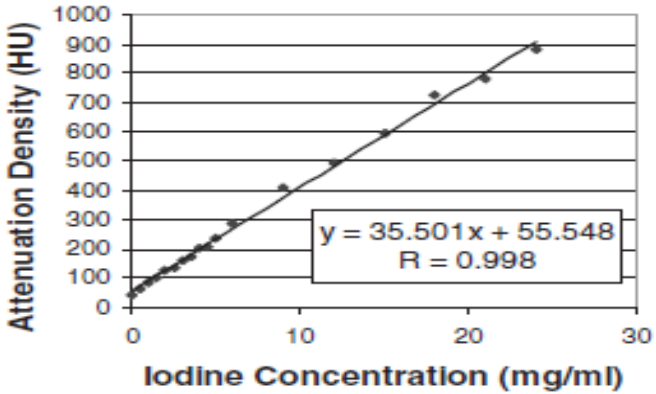
# Stress CT perfusion Principles

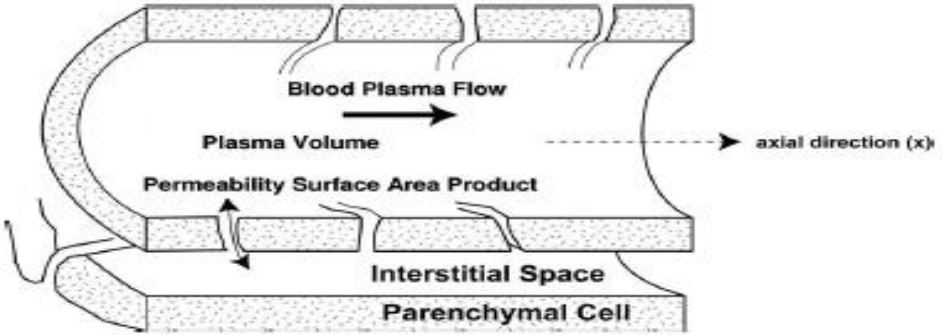


# CT Contrast Agent Properties

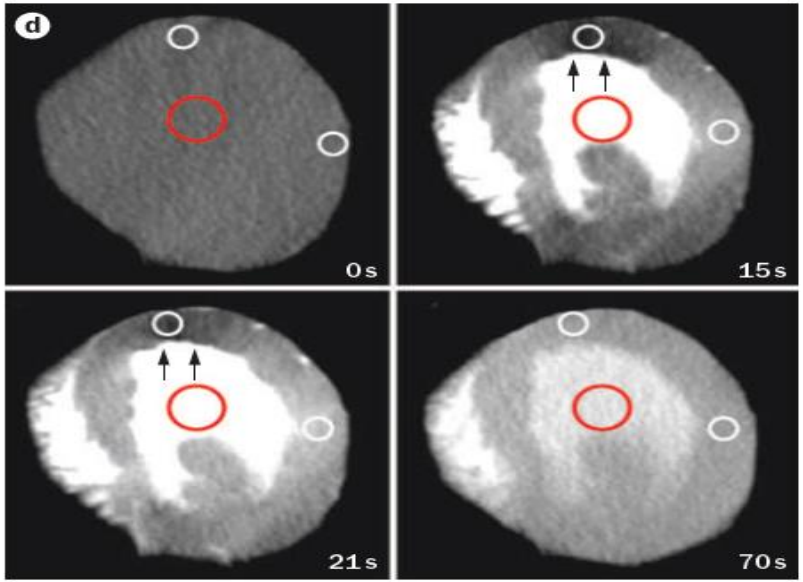
- Iodinated contast agents
  - Mol weight: 500-700 u
  - Extravascular diffusion

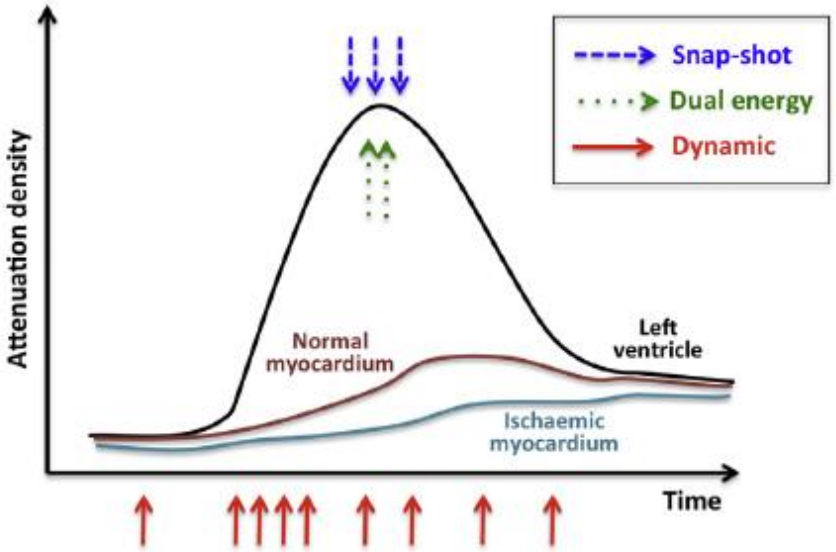


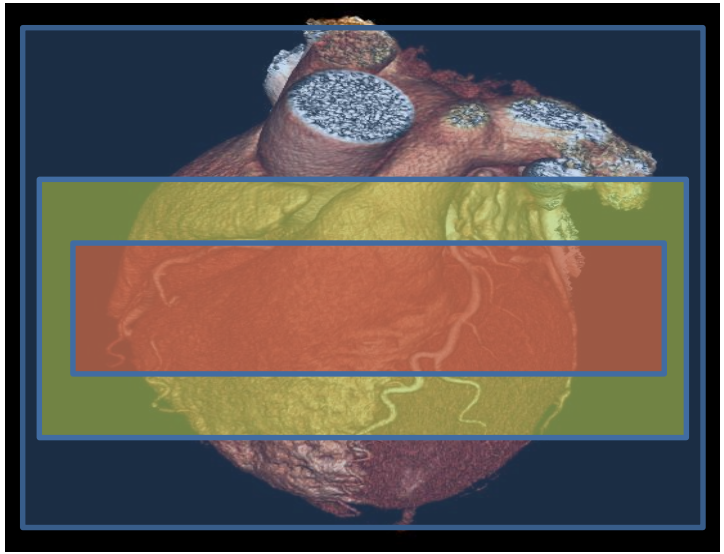
# Time course of Contrast enhanement



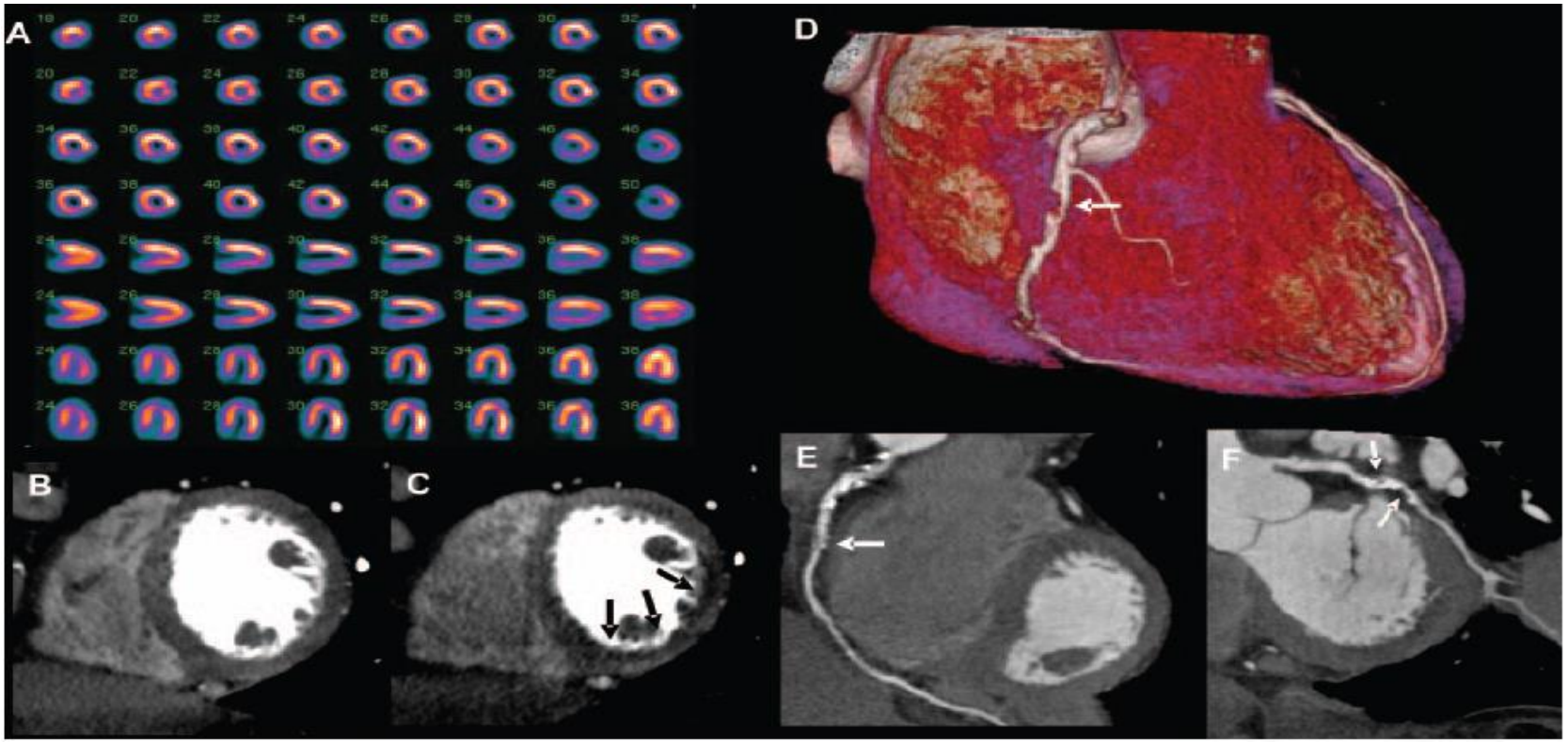
# Limitations of dynamic scanning for absolute quantification

- Requires dynamic full body coverage CT
  - 320 slice CT with 16 cm coverage
- Radiation dose.



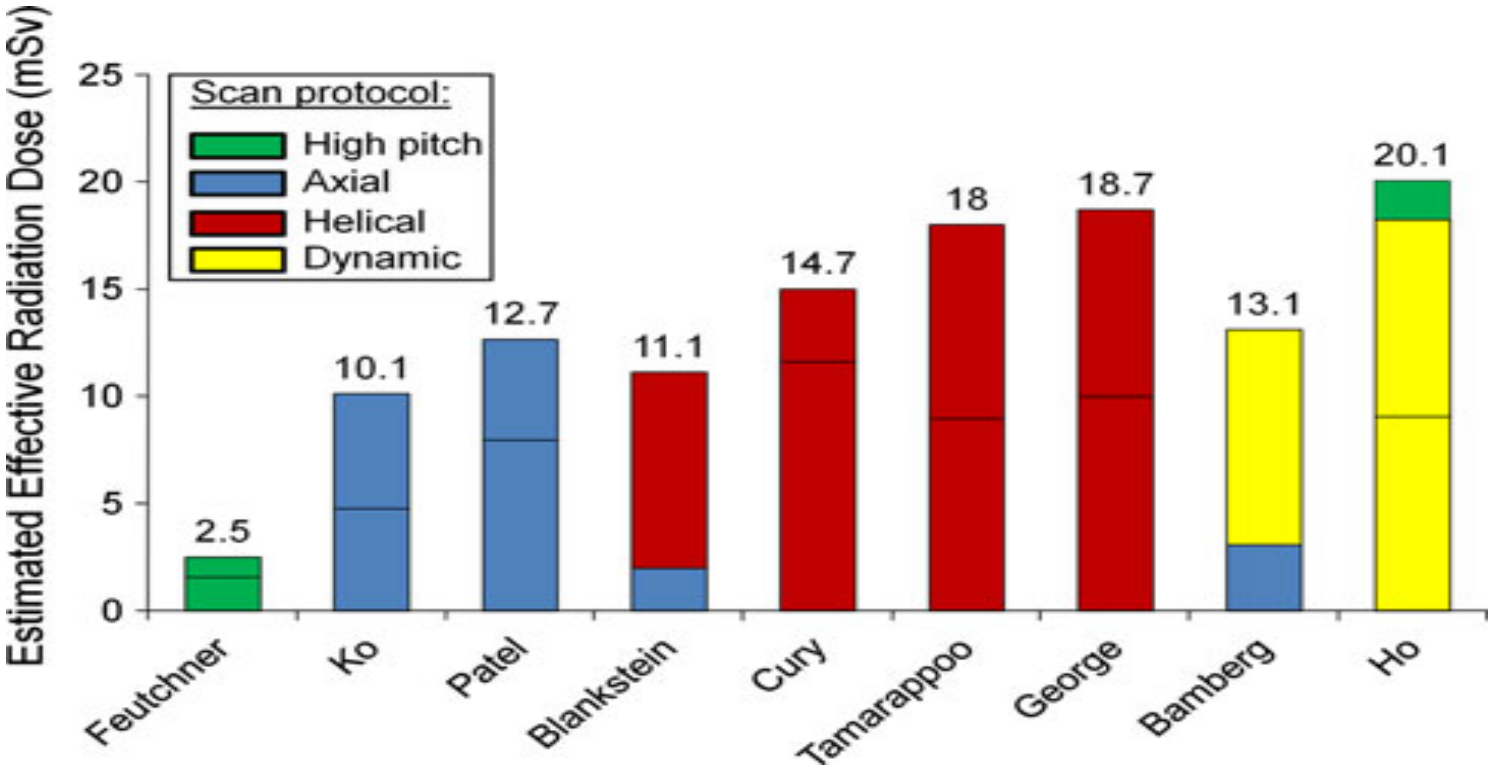
320 slice
=16 cm coverage
1 stack
128 slice
=8 cm coverage
2 stacks
64 slice
=4 cm coverage
4 stacks

# 320 slice CT




George Circ Cardiovasc Imaging 2009;2;174-182

# CT Perfusion Imaging Radiation Dose



# Results:

## Single Center Studies CTP+CTA vs QCA/ FFR

| Study | Scanner | n | Sens | Spect | PPV | NPV |
|---|---|---|---|---|---|---|
| George et al. 2009 | 64/256 MDCT | 27 | 86 | 92 | 92 | 85 |
| Blanstein 2009 | DSCT | 33 | 92 | 7 | 89 | 79 |
| Rocha-Filho 2010 | DSCT | 34 | 96 | 100 | 100 | 91 |
| Cury 2010 | 64-MDCT | 36 | 94 | 75 | 89 | 86 |
| Ho 2010 | DSCT | 35 | 95 | 65 | 78 | 79 |
| Ko 2011 | DSCT | 40 | 87 | 95 | 89 | 94 |
| | | **205** | **86-96** | **67-100** | **78-100** | **79-94** |

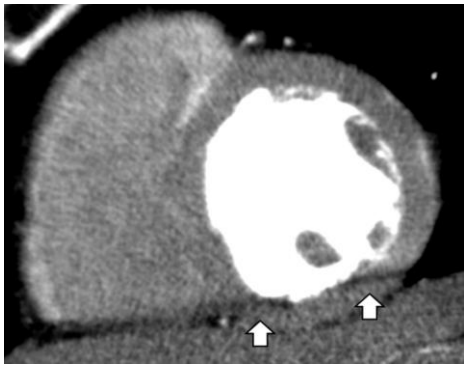
## Multi Center Studie CTP+CTA vs ICA and SPECT

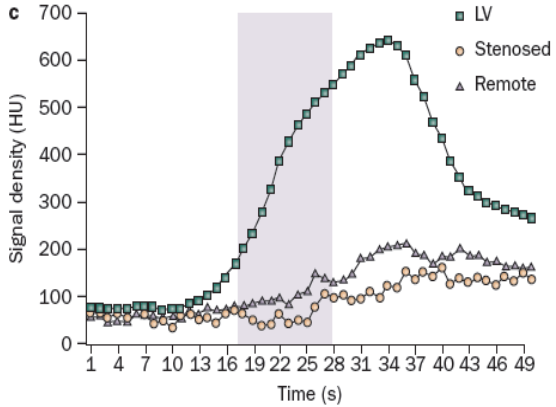
| | Sensitivity (%) | Specificity (%) | PPV (%) | NPV (%) |
|---|---|---|---|---|
| **CTA alone** | 92 (87-96) | 51 (44-57) | 53 (47-60) | 92 (86-96) |
| **CTA + CTP** | 80 (72-86) | 74 (68-80) | 65 (58-72) | 86 (80-90) |

- Parameter : Ischemia, EF, volumes, prognosis, MBF, prognosis value (?)

- Success ?:
- limited expertise, many trap
- artifact, heterogeneity in protocols

- Price : Research





# To conclude

- Stress perfusion CT is a promising approach to combine functional with anatomical imaging.

- First single and multicenter results are promising, but the technique requires further development.