

Digital Variance Angiography (DVA):
a new technology in X-ray angiography

Krisztián Szigeti, CEO



Pain points in angiography procedures today

High risk

**X-ray induced
adverse events**

**Contrast induced
nephropathy
(~2%)**

Low image quality

**Poor visibility of
small vessels**

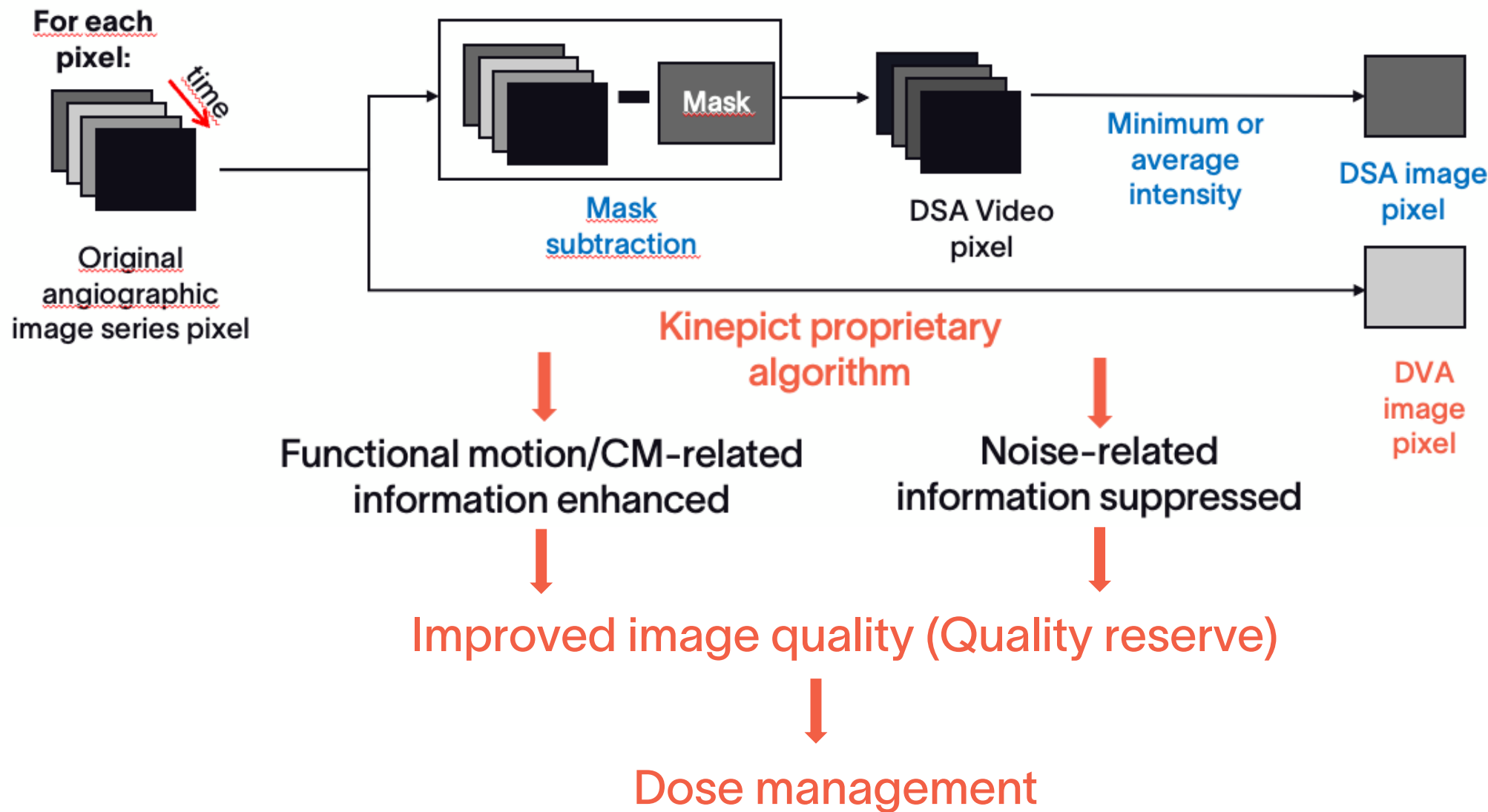
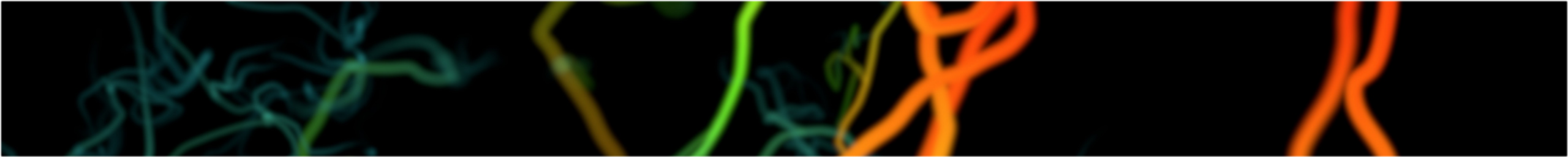
**Poor image
quality in CO2
angiography**

High cost

**A new angiography
suite costs €1,2M**

**X-ray tube costs
€100k**

...but





Improved image quality

Improved image quality in lower limb interventions

Iodinated contrast media



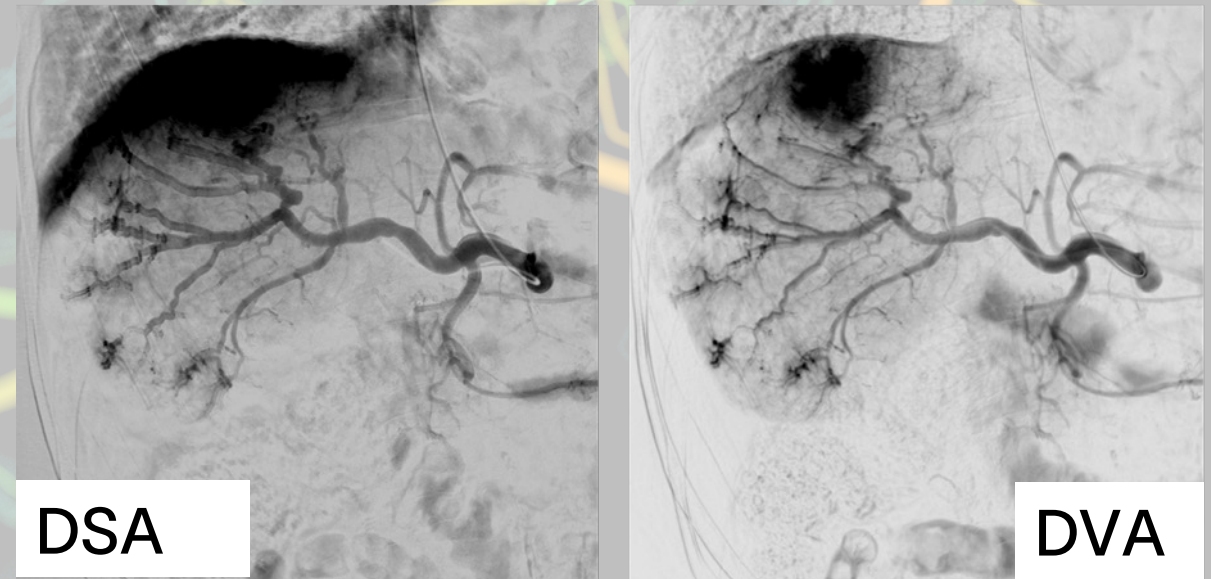
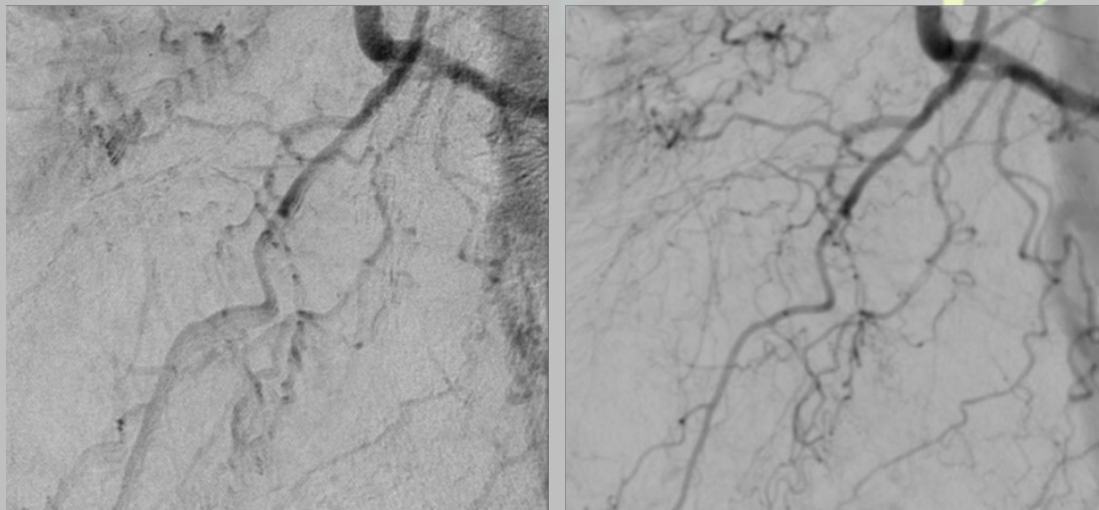
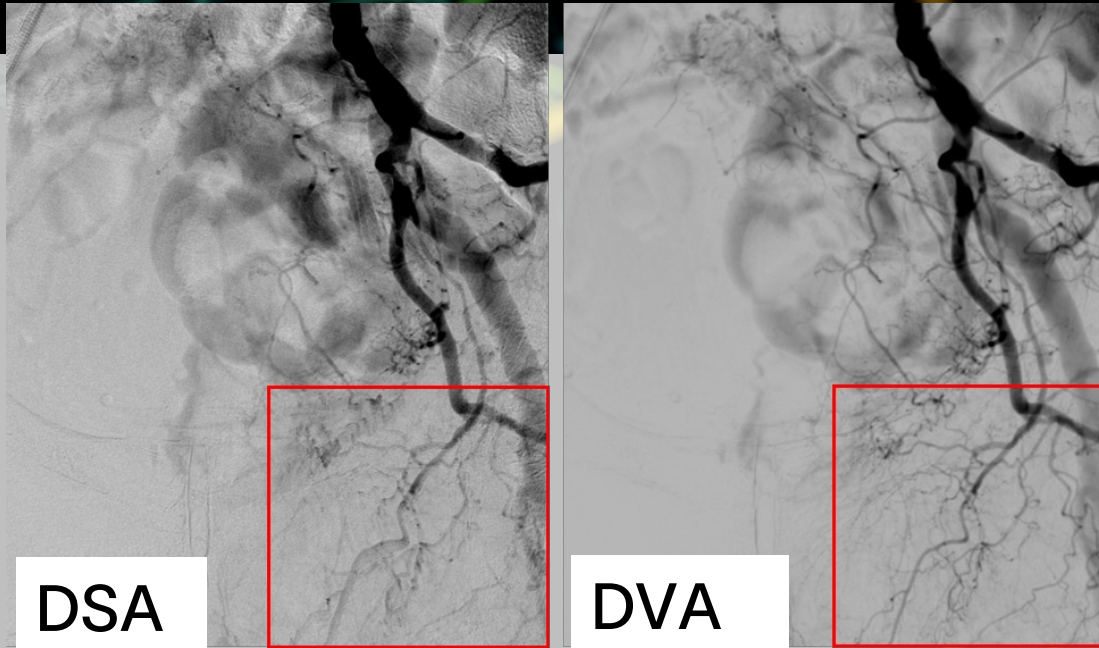
Gyano et al, 2019, Radiology, 290:246-253

Carbon dioxide



Orias et al, 2019, Invest Radiol, 54:428-436

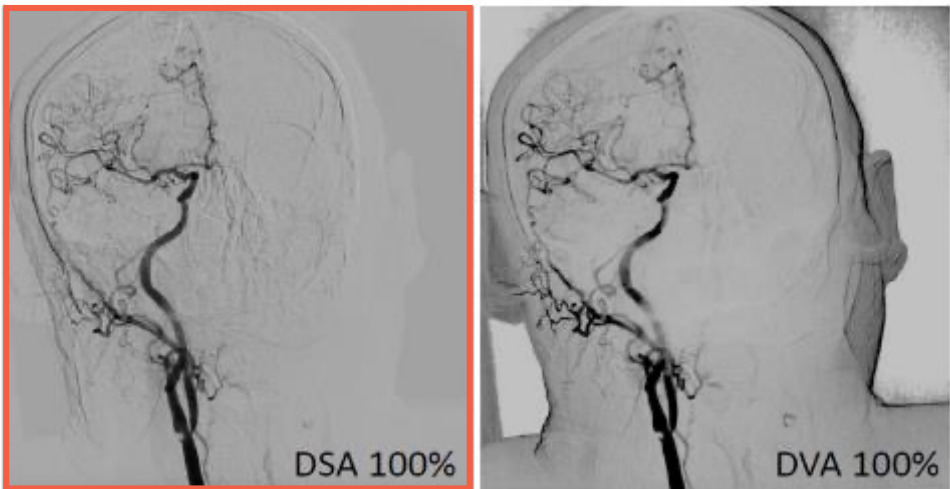
... in prostatic artery and in liver transarterial chemoembolization



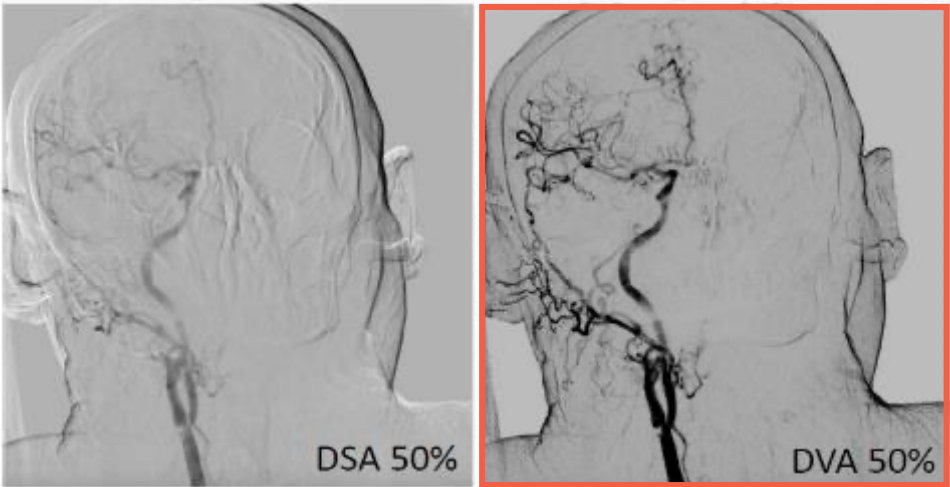
Dose management capabilities

Contrast media reduction

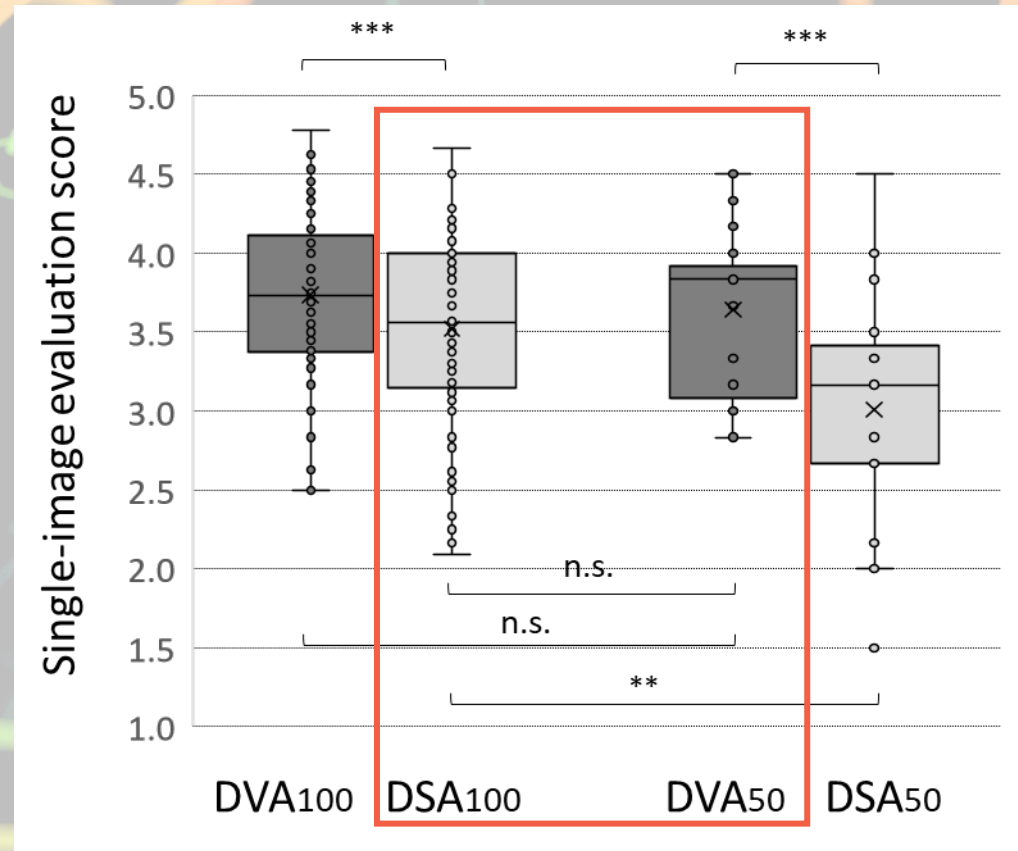
6 ml ICM



3 ml ICM



Carotid angiography



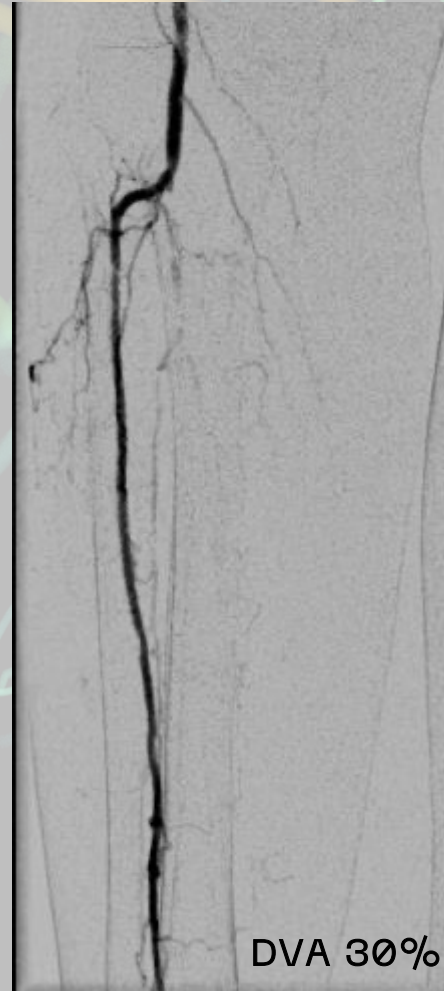
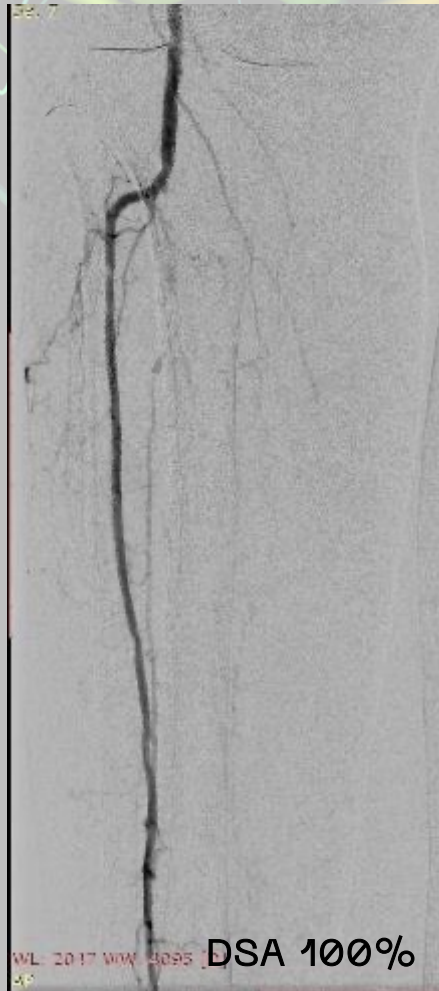
Wilcoxon signed rank test

Mann-Whitney U test

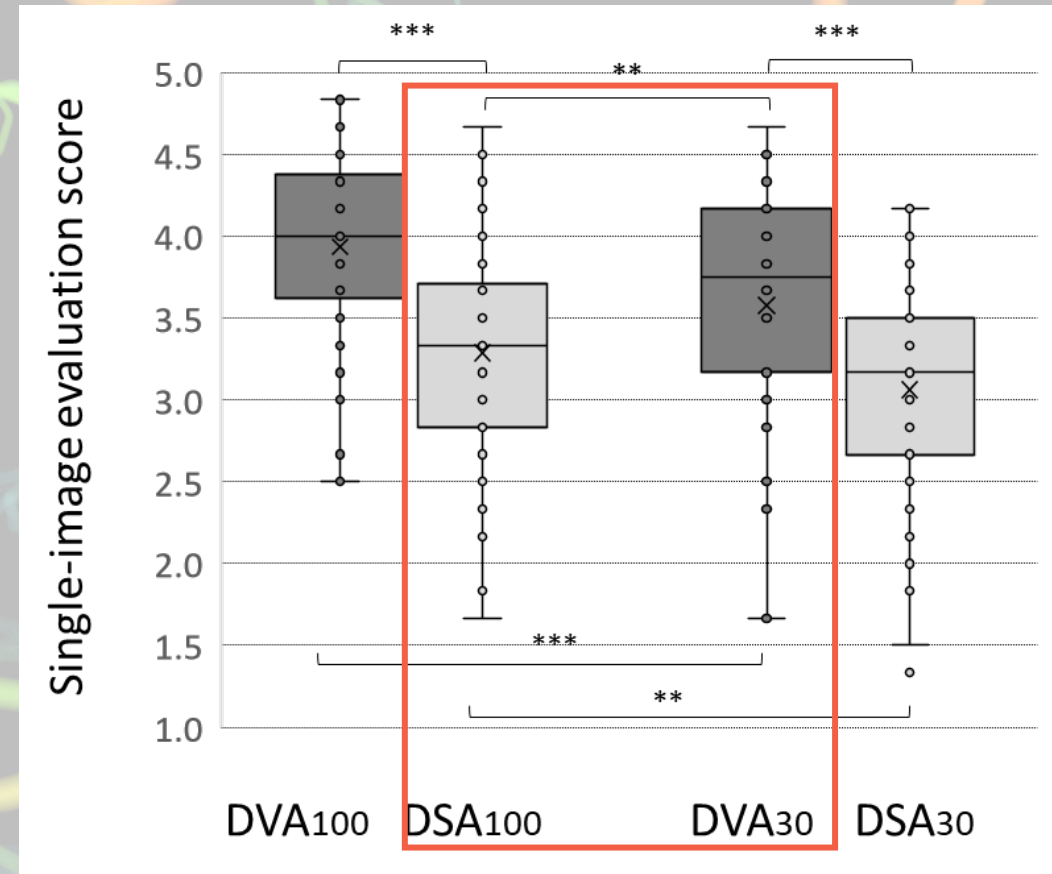
Radiation dose reduction

1.2 $\mu\text{Gy}/\text{f}$

0.36 $\mu\text{Gy}/\text{f}$



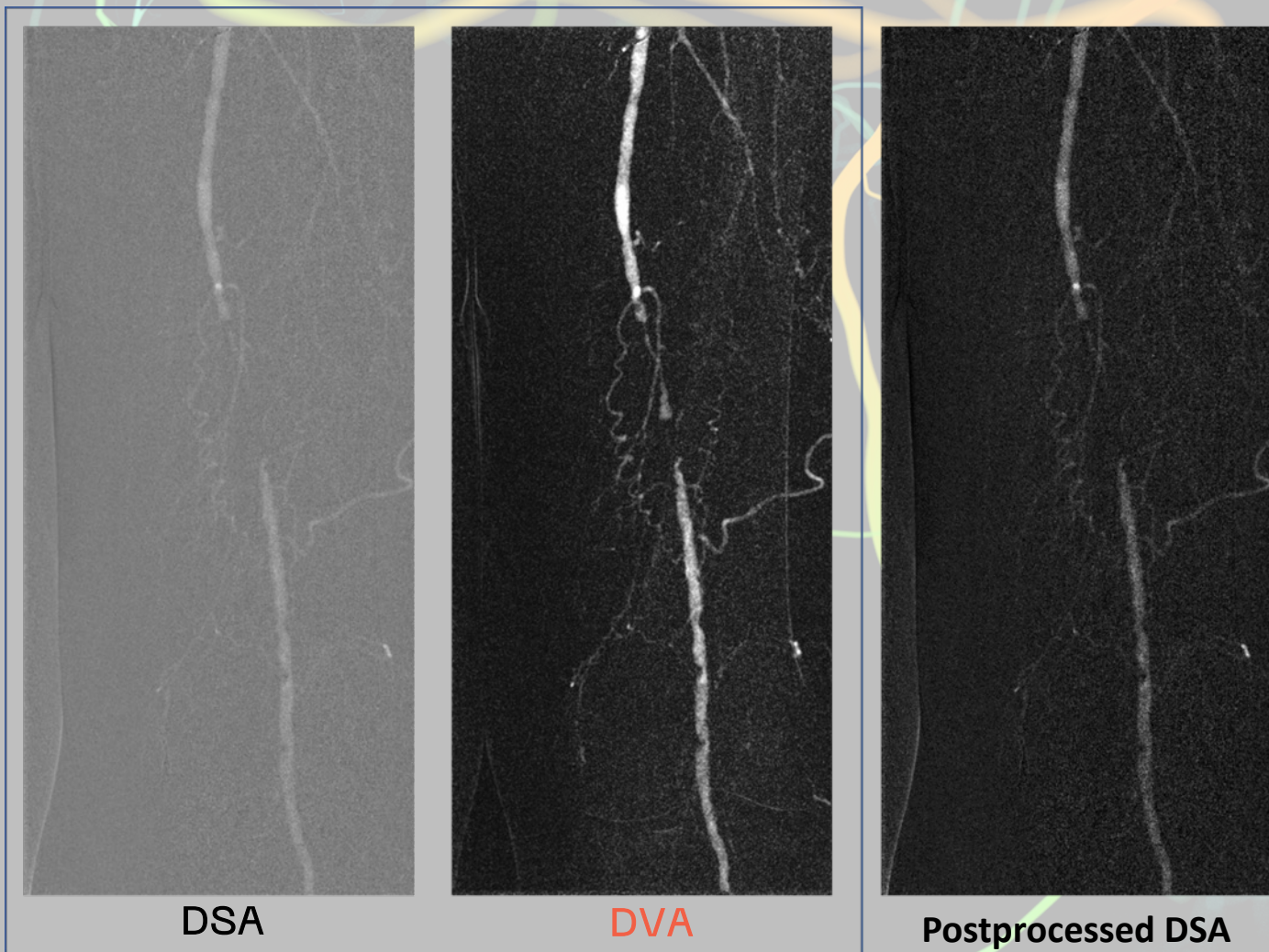
Lower limb angiography
(crural region, ICM)



Gyano et al, 2021, Sci Rep 11:21790

Quality enhancement and dose management in CO₂ angiography

Operating Room Monitor (real-time display)



Dose management

CO₂ acquisition protocol
(modified Evenflow,
1 fps instead of 7.5)



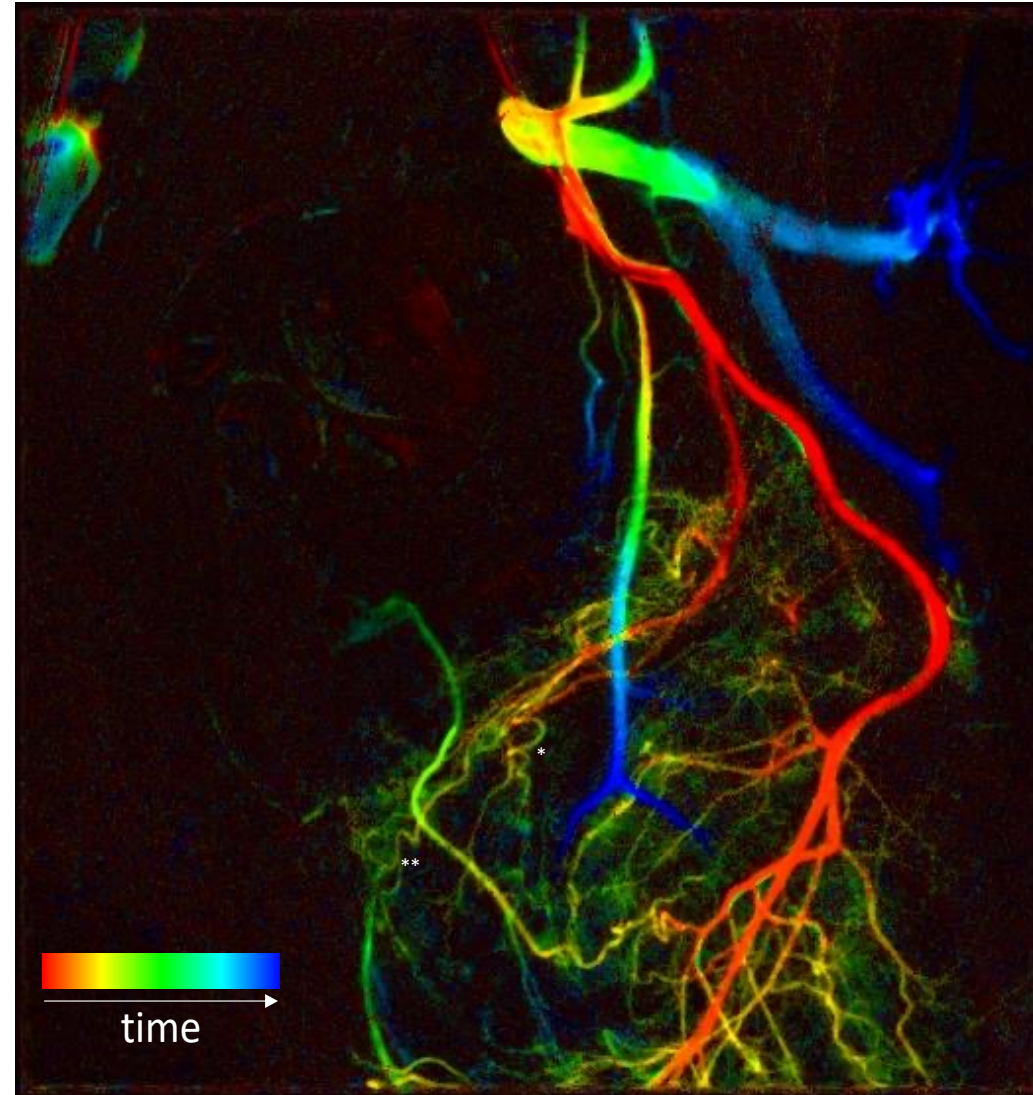
substantial radiation
dose reduction

high degree stenosis and occlusion with collaterals in the femoral region

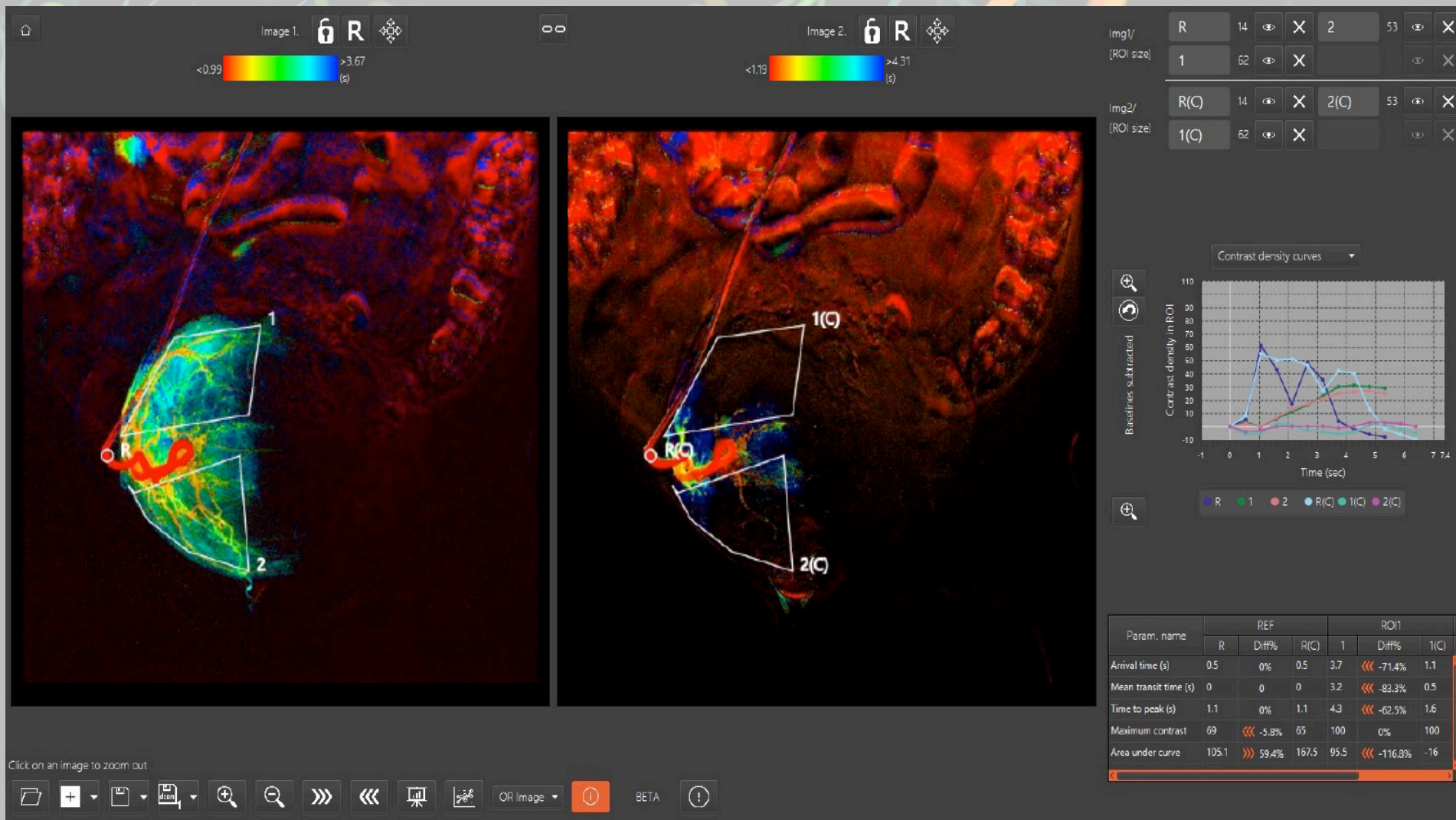
Gyano et al, 2020, Cardiovasc
Intervent Radiol, 43:1226-1231

Additional applications

Use of ccDVA in prostatic artery embolization



Kinepict Medical Imaging Tool



Uterine fibroid embolization

* clinical validation in progress

Motion-free registration in liver TACE

DSA



DVA+motion free function



How is it integrated into
the clinical workflow?

Kinepict Medical Imaging Tool



Kinepict workstation in the control room of the cath lab

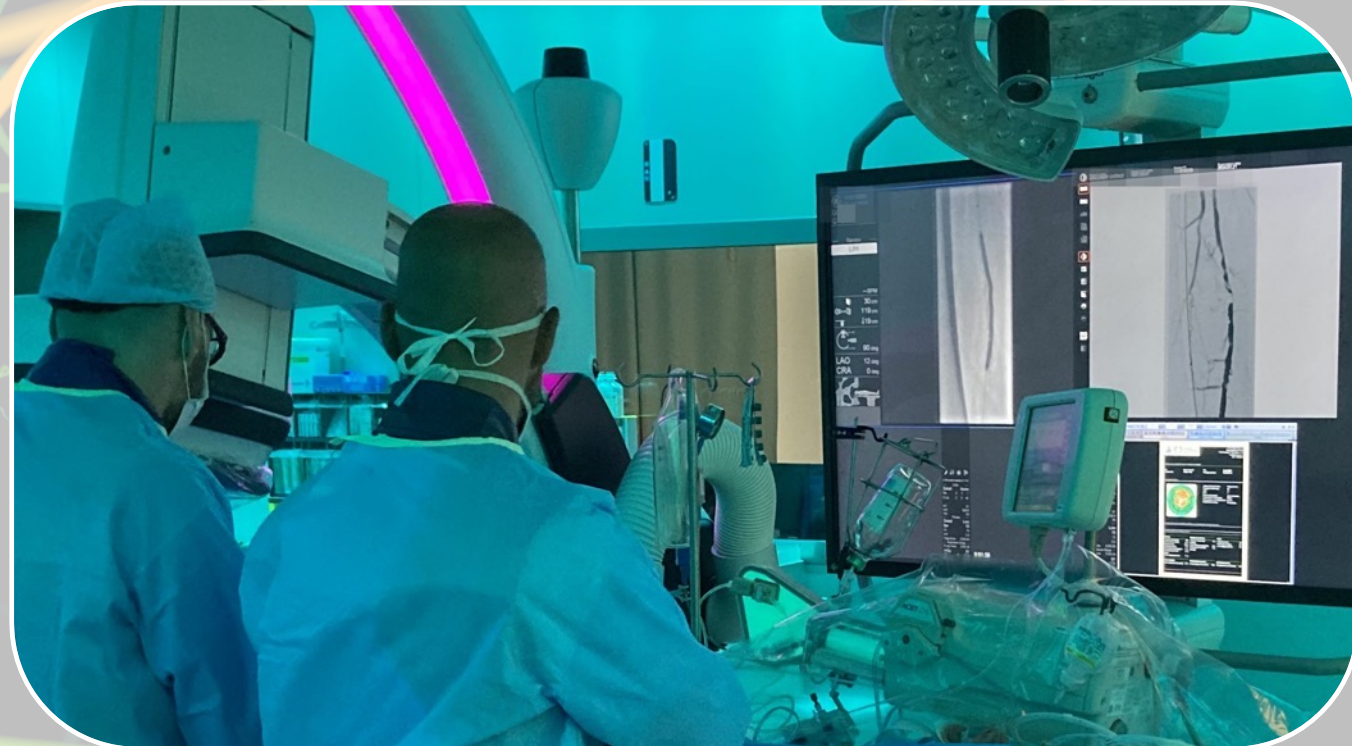
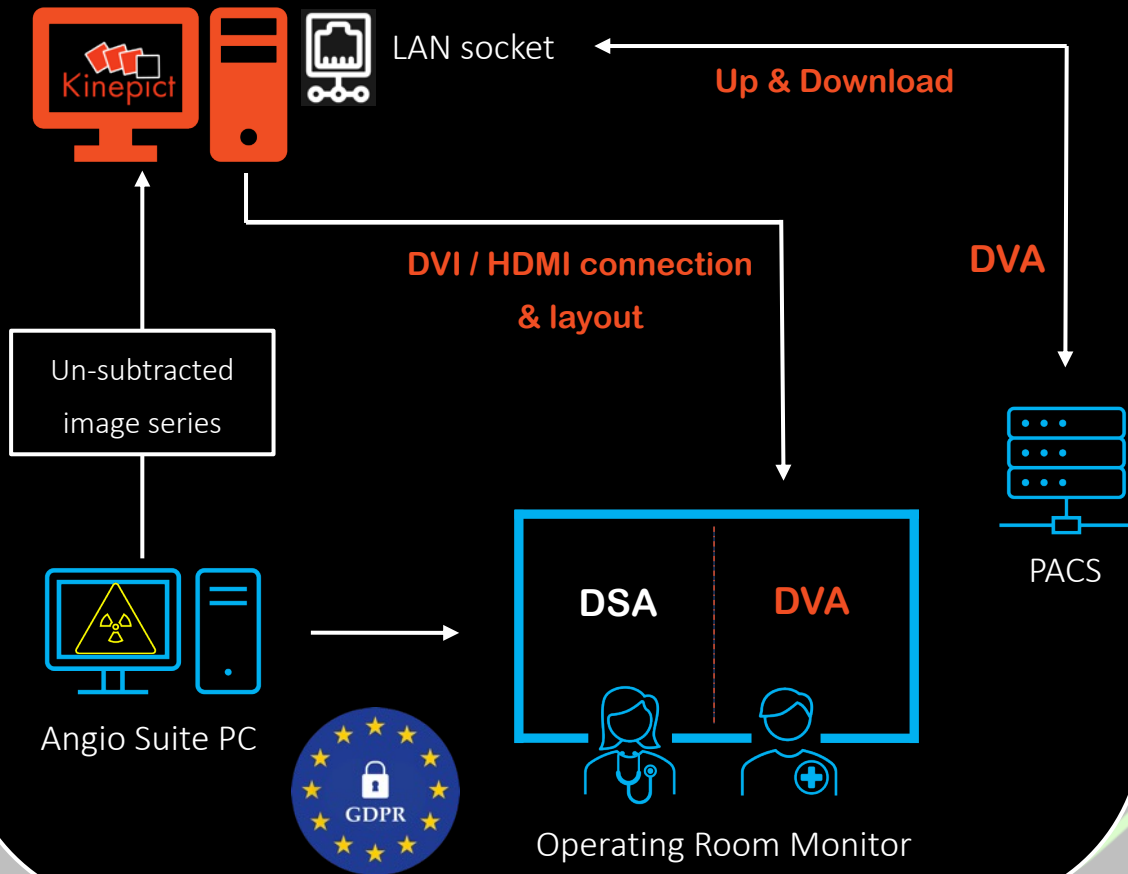
Angiography platform-independent
Medical device software class IIa

Patented technology inside:
Digital **V**ariance **A**ngiography



Kinepict Medical Imaging Tool

System integration



DAILY ROUTINE USE OF KINEPICT

Common femoral artery and femoro-popliteal multiplex angioplasty at the Heart and Vascular Center of Semmelweis University

| | | | |
|--------------|--------------------|------------|------------------|
| Patient name | Patient birth date | Patient ID | Examination date |
| NAME NONE | | NOID | 2022.08.01 |

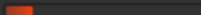
48 images

SHOW INPUT

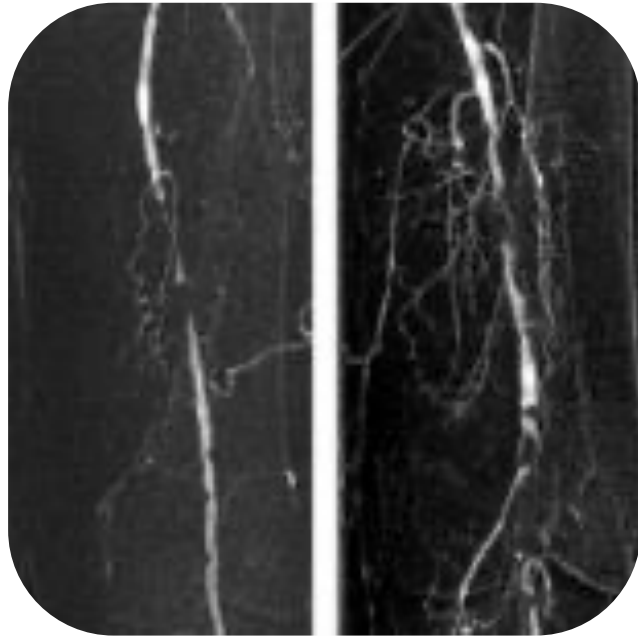
SHOW BROWSER

DETAILS

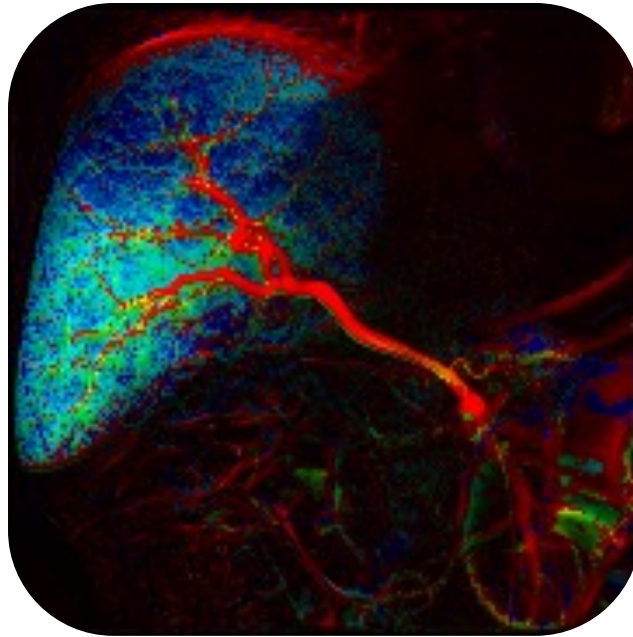



Image generation in progress...

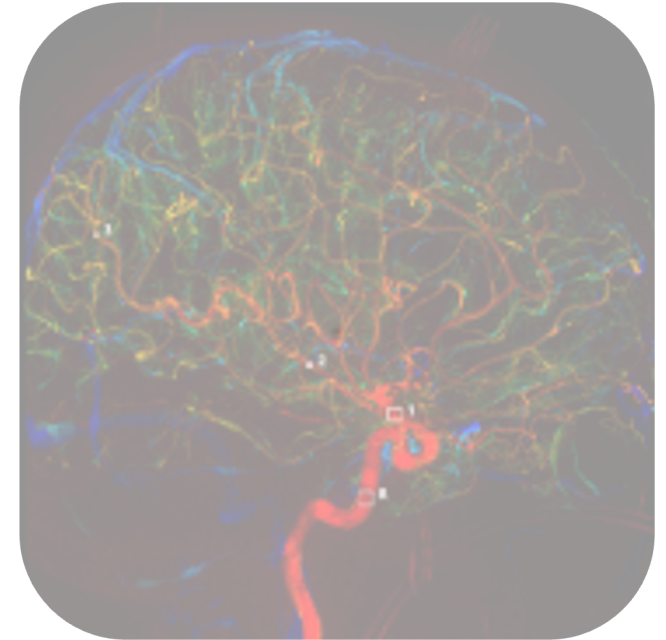
Kinepict Medical Imaging Tool – Main fields



Peripheral Interventions
& Vascular Surgery



Interventional Oncology
Embolization procedures



Carotis & Neuro
interventional radiology

10,000+ PATIENTS EXAMINED,
150,000+ DVA IMAGES GENERATED
10 PUBLISHED CLINICAL STUDIES

Kinepict Medical Imaging Tool – Our users



Dr Michael Lichtenberg · 1st
Klinikum Hochsauerland Vascular Center
1mo · 🌐

Today we did the first procedures with the Kinepict Medical Imaging Tool. 70% less contrast and significant less x-exposure. This image was done with 1ml contrast diluted with 19ml saline. This is a clear step forward to improve angiographic guided peripheral intervention even with modern angiolab set-ups.

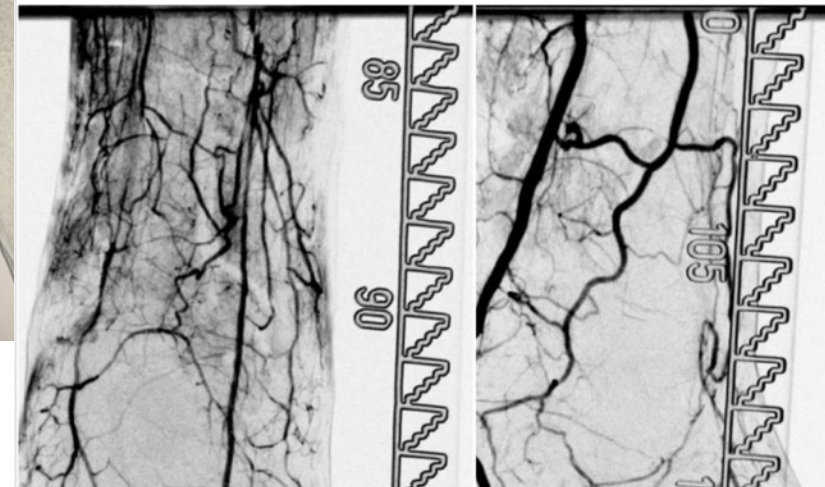
<https://kinepict.com/>

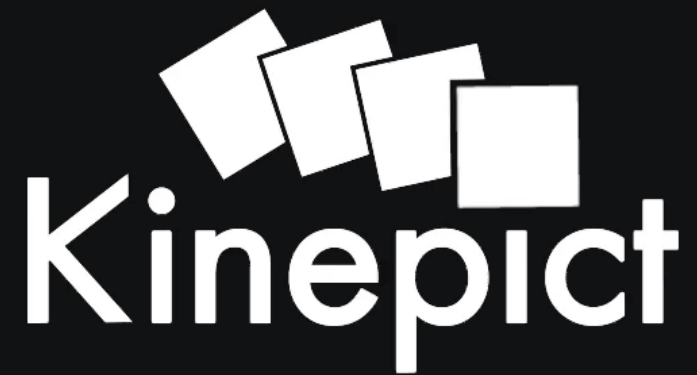


Dr Michael Lichtenberg · 1st
Klinikum Hochsauerland Vascular Center
1mo · Edited · 🌐

With just a few ml of contrast crystal clear DSA in a renal insufficient patient. Impressive! The new Kinepict technology significantly reduces contrast volume and x-ray exposure.

<https://kinepict.com/>





Kinepict Medical Imaging Tool – our values I.



Kinepict offers:

Substantial radiation risk reduction

The pain point:

X-ray induced **adverse events** effect catheter lab personnel and patients

A new **X-ray tube costs** €100k

Economic benefit:

Reduced risk of X-ray induced adverse events

Increases life time of X-ray tube

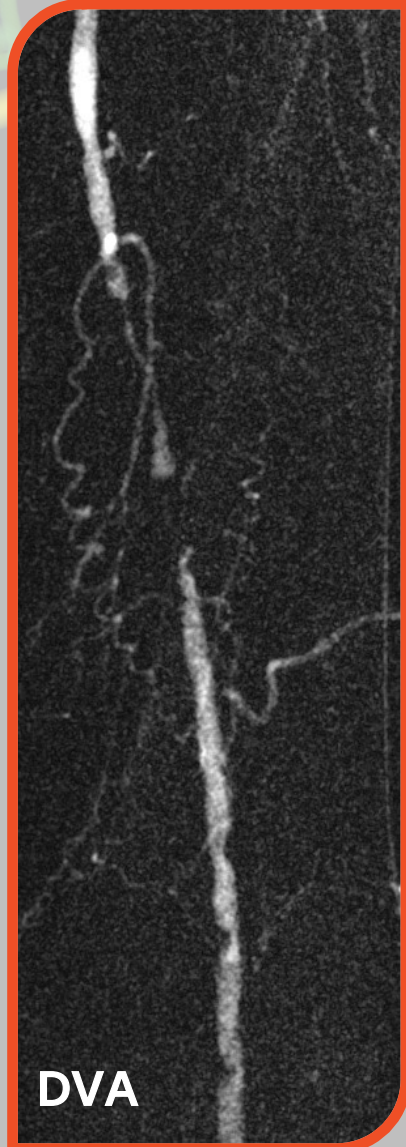
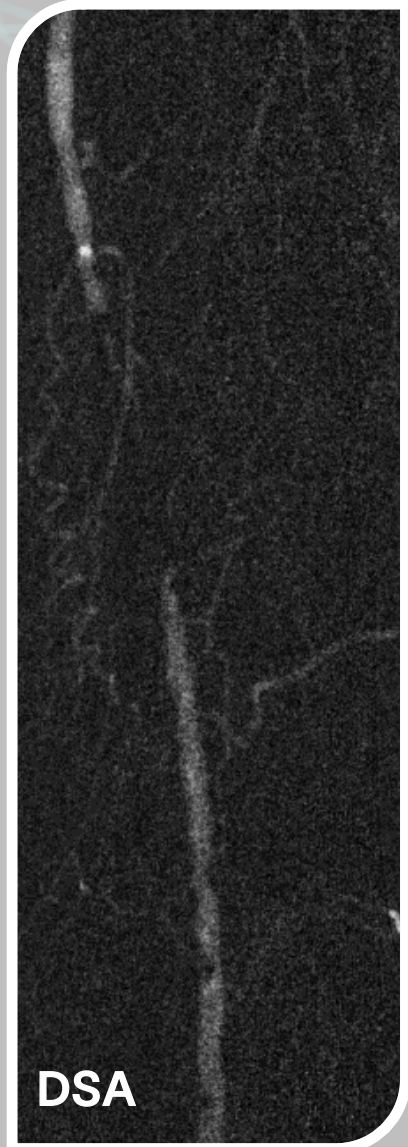
[nature](#) > [scientific reports](#) > [articles](#) > article

scientific reports

Article | [Open Access](#) | [Published: 08 November 2021](#)

Digital variance angiography allows about 70% decrease of DSA-related radiation exposure in lower limb X-ray angiography

Kinepict Medical Imaging Tool – our values II.



Kinepict offers:

Exceptional image quality for CO₂ angiography

The pain point:

Poor **image quality** in CO₂ angiography, the 1st choice in diabetic and renal failure patients

Economic benefit:

Applicability of CO₂ as contrast agent due to **improved** image quality.
More patients, **additional revenue** for the catheter lab

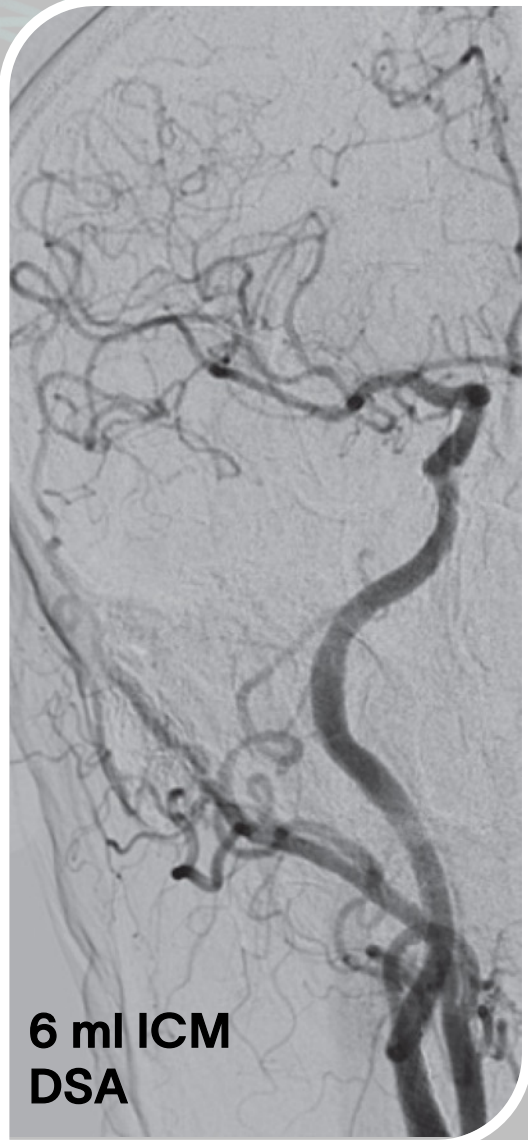
Technical Note | [Open Access](#) | [Published: 31 May 2020](#)

Initial Operating Room Experience with Digital Variance Angiography in Carbon Dioxide-Assisted Lower Limb Interventions: A Pilot Study

[Marcell Gyánó](#), [Csaba Csobay-Novák](#), [Márton Berczeli](#), [István Góg](#), [János P. Kiss](#), [Krisztián Szigeti](#), [Szabolcs Osváth](#) & [Balázs Nemes](#) ✉

CardioVascular and Interventional Radiology 43, 1226–1231 (2020) | [Cite this article](#)

Kinepict Medical Imaging Tool – our values III.



Kinepict offers:

ICM dose reduction

The pain point treated:

Contrast Induced nephropathy
adverse event in ~2% of interventions

Utility and economic benefit:

Higher safety for patients, €200k cost saving / year
Reduced ICM consumption €15k / year



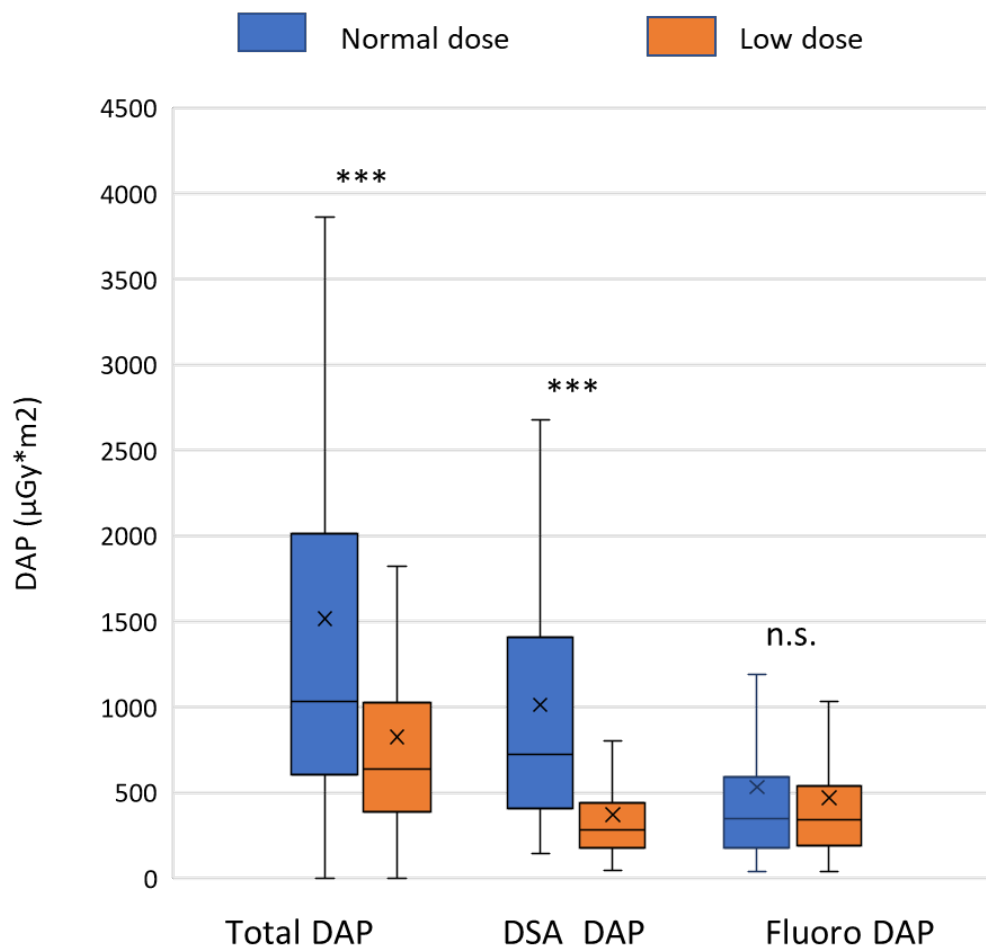
European Journal of Radiology Open

Volume 7, 2020, 100288



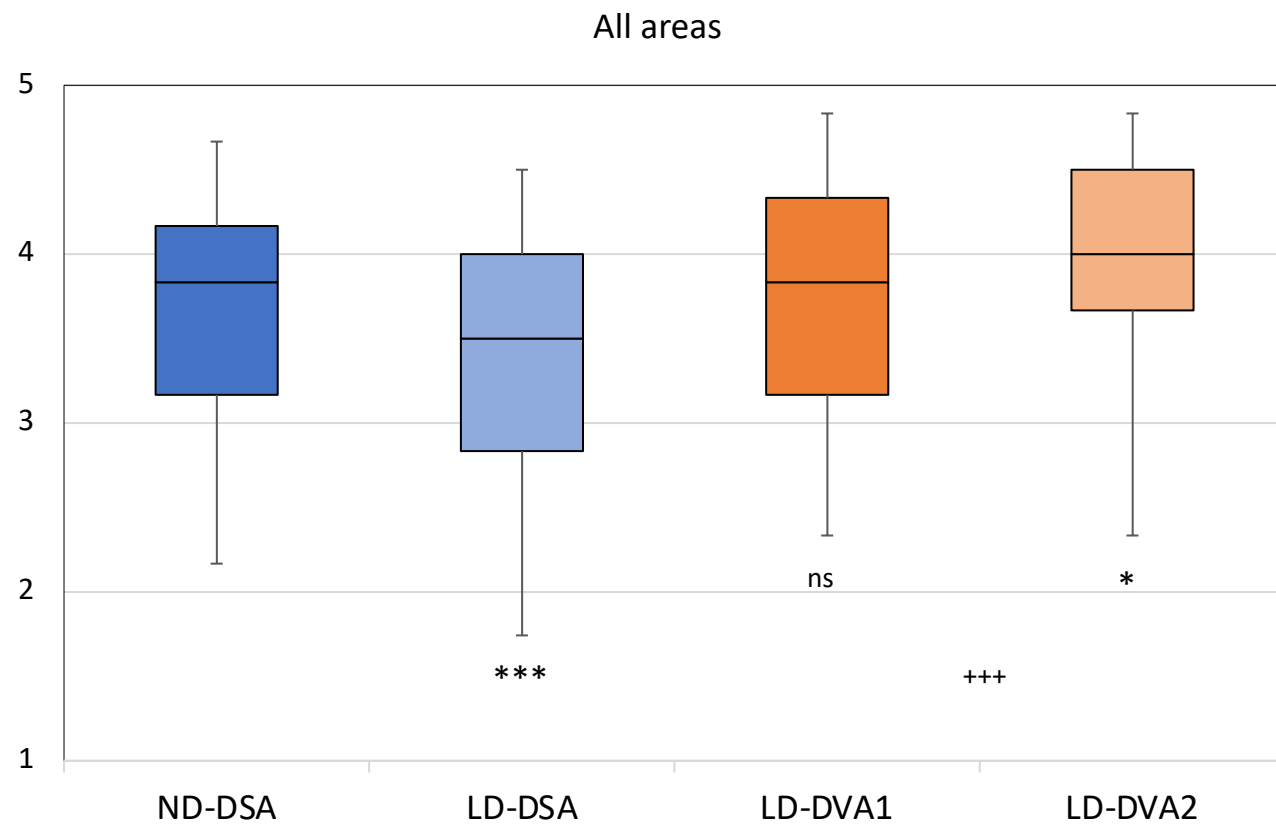
Initial evidence of a 50% reduction of contrast media using digital variance angiography in endovascular carotid interventions

Radiation dose reduction in a prospective randomized controlled trial



-45 %

-63 %



About Us




KINEPICT Health Ltd. is a Europe (Budapest, Hungary) based company founded in 2016 by Szabolcs Osváth and Krisztián Szigeti.


20 employees specialized in radiology, software development, medical affairs, and sales.




Kinepict Medical Imaging Tool – Testimonials, webinars

 **Vascupedia**
8,919 followers
1w · 🌐

Now online @ [Vascupedia](#) | recorded webinar
Better Quality, fewer risks – how CO2 and X-Ray dose reduction can change your practice
...see more

OneView 



Better quality, fewer risks - how CO2 and X-ray dose reduction can change your practice

© Kinepict

Better Quality, fewer risks – how CO2 and X-Ray dose reduction can change your practice



[Watch here](#)



We treat a lot of patients who suffer from uterine fibroids in private hospital care.



[Watch here](#)



Prof. Peter Sotonyi M.D.
Head of Department of the Vascular and Endovascular Surgery of Semmelweis University



[Watch here](#)

Complete Value Proposition of Kinepict

| Goal of DVA usage | Problem | Solution and utility of DVA | Economic benefit to cathlab | Clinical references |
|---|---|---|--|---|
| X-ray dose reduction | X-ray induced adverse events effect cathlab personnel and patients | Reduced risk of X-ray induced adverse events by up to 70% | Higher safety for both cathlab personnel and patients | <ul style="list-style-type: none"> • Cardiovasc Intervent Radiol 2021, Bastian lower limb • J Vasc and Intervent Radiol 2021, Thomas lower limb • Scientific Reports 2021, lower limb |
| | A new X-ray tube costs ~150.000 EUR and lasts ~5-8 years | Increased life time of X-ray tube by years due to lower usage | ~20.000 EUR cost saving / extended year / average cath lab | https://info.blockimaging.com/how-long-will-my-cath-lab-tube-last |
| CO2 angiography - image quality improvement | Poor / unacceptable image quality in CO2 angio, which is the 1 st choice in diabetic and renal failure patients | Applicability of CO ₂ as contrast agent due to improved / acceptable image quality | More patients, additional revenue for the cathlab | <ul style="list-style-type: none"> • Cardiovasc Intervent Radiol 2020, Gyano lower limb • Investigative Radiol 2019, Orias lower limb |
| ICM angiography - image quality improvement | A new angiosuite costs ~1.000.000 EUR and lasts ~6 years | Old angio can be used for many more years with image quality "upgrade" by DVA | ~150.000 EUR cost saving / extended year / cath lab | Customer feedback and Kinepict's own experience during clinical trials |
| | Poor visibility of small vessels with ICM angio, esp. problematic in artery embolisation and stroke treatment | Visualisation of feeding arteries with ccDVA (color coded DVA), and better general visibility of small vessels with DVA | Less post-operative complications (e.g. erectile dysfunction caused by accidental embolisation of penis artery) | Clinical trials in progress prostatic, hepatic, uterine |
| ICM dose reduction | Contrast Induced Nephropathy (CIN) adverse event in ~2% of interventions costs ~€20,000 / case | Reduced risk of CIN by ~50% | Higher safety for patients, ~200.000 EUR cost saving / year / average cathlab | <ul style="list-style-type: none"> • Eur J Radiol 2020, Orias carotid • J Med Econ 2007, Subramanian • Invest Radiol 2018, Nijssen |

Cost-effectiveness Analysis (Kinepict, NHS)

DVA in Patients Undergoing Lower Limb Arterial Recanalization: Cost-Effectiveness Analysis within the English Healthcare Setting

- The model explored the impact of DVA on the development of acute kidney injury (AKI), chronic kidney disease (CKD), and radiation-induced (RI) cancer over a lifetime horizon.
- Scenario analyses show that cost savings range €450 – 600 / patient.
- Quality adjusted life years gains ranging from 0.048 to 0.109 per patient, €1.2M – 3.4M / year savings on an average catheter operating room
- The potential for this technology to offer an economically viable alternative to existing image processing methods.

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10,000+ PATIENTS EXAMINED,
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