

CO₂- Angioset

THE ALTERNATIVE TO CONVENTIONAL
IODINATED CONTRAST ANGIOGRAPHY



arterial



venous



CO₂-ANGIOSET



For more information about the CO₂-AngioSet
please download our abstract book



ANGIOGRAPHY AT A GLANCE

Conventional angiography with iodine-containing or low osmolar contrast agents is still considered as the “gold standard”. However, the **side effects of X-ray positive, conventional contrast agents** and the **physical strain for the patient** are well known. Although the substances of contrast agents have become much more tolerable, some limitations remain to be considered and handled responsibly with the respective indication.

Since the beginning of the last century, various gases have been tested and used in radiological diagnostics, with **CO₂ performing well as blood-soluble gas**, being **exhaled physiologically through the lungs and thus removed from the body**. The application of gas generally results in decreased X-ray absorption and unlike conventional contrast agents, leads to an X-ray negative increase of the image contrast. This comparatively low contrast of gases and the initially limited technical capacity of X-ray machines did not allow application in the entire vascular system for long.

In 1980, by introducing **Digital Subtraction Angiography (DSA)** and the possibility that comes along with **electronic image post-processing**, this technical disadvantage – compared to conventional angiography contrast agents – could be compensated.

As early as in 1982, Hawkins (et al.) first introduced **CO₂ angiography with a computer-based calculation**. However, CO₂ as a vascular contrast agent spreads only slowly due to the necessary technical conditions as well as its physical and chemical properties.

Today, **CO₂** is a **reliable alternative contrast agent in clinical practice** and being non-toxic is particularly suitable for patients with renal deficiency, hyperthyroidism or known intolerances to contrast agents used in diagnostic and interventional radiology.

Handling is similar to that of a conventional DSA and, due to the low viscosity of the gas, can **even be processed with small-bore access (3F)**. An additional advantage is the **option of showing flow dynamics** (e.g. in the localisation of leaks).

Source:1) Hawkins IF Jr, Mladinich CR, Storm B, Croker BP, Wilcox CS, Akins EW, Drake W. Short-term effects of selective renal arterial carbon dioxide administration on the dog kidney. J Vasc Interv Radiol. 1994 Jan-Feb;5(1):149-54. doi: 10.1016/s1051-0443(94)71474-3. PMID: 8136595.

BENEFITS OF CO₂ ANGIOGRAPHY

**THE ONLY 100 % BIOCOMPATIBLE CONTRAST AGENT
AND THE ALTERNATIVE TO CONVENTIONAL IODINATED
CONTRAST ANGIOGRAPHY**

No adverse reactions such as allergy, nephrotoxicity
and hepatotoxicity

Can be used for patients with an intolerance
to iodinated contrast medium

Can be used in combination with iodinated contrast agents
(to reduce side effects of non-ionic contrast agents containing iodine)

Only small-calibre accesses are required (20G, 3F)

GENERAL COMPARISON: CO₂ VERSUS (IODINATED) CONTRAST AGENTS:

Physics	Contrast agent	CO ₂
Viscosity	+	-
Flow rate	-	+
Radiopacity	Positive contrast agent	Negative contrast agent
Molecular structure (complexity)	↑ (high)	↓ (low)
Degradation / excretion	Kidneys	Lungs (primarily)
Contraindication	• Contrast agent allergy • Renal insufficiency • Hyper / hypothyroidism	• Atrial septal defect • Ventricular septal defect • Open foramen ovale • Respiratory insufficiency • Blood vessels above the thoracolumbar junction
Binding capacity of erythrocytes		CO ₂ ↑ vs. O ₂ ↓
Henderson-Hasselbach equation		• Blood pH deviation with possible changes in the acid-base balance

This comparison represents only a general overview and does not claim to be exhaustive.
For further information, especially about contraindications, please refer to the instructions for use.



This information does not replace the instructions for use –
Information for medical experts only

CO₂ ANGIOGRAPHY IN PRACTICE – A RELIABLE ALTERNATIVE

FOR A BROAD RANGE OF INTERVENTIONS AND APPLICATIONS –
ALSO FOR THE MORE CHALLENGING PATIENTS

- Renal insufficiency
- Patients with intolerance to iodinated contrast media
- Presentation of pathological shunts
- Search for sources of haemorrhage
- Display of abdominal aortic aneurysms
- Hyperthyroidisms
- Arteries of the leg
- Pelvic arteries
- Infrarenal aorta
- Visceral arteries
- Renal arteries
- Hemodialysis shunts
- Venous presentation
(max. 40 ml per injection)
- Cholangiography
(depending on the position)

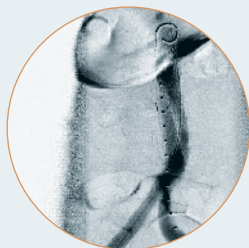
COMPARISON BEFORE AND AFTER

EVAR

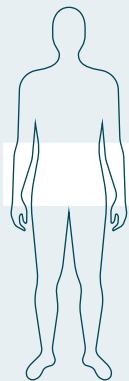
(endovascular aortic repair)



before



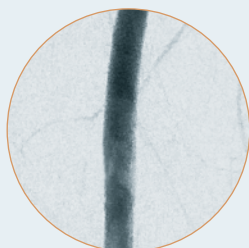
after



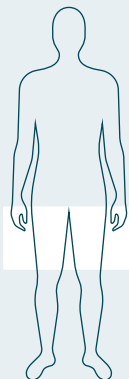
Angioplasty



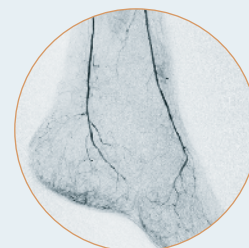
before



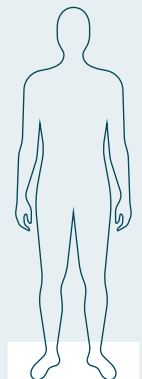
after



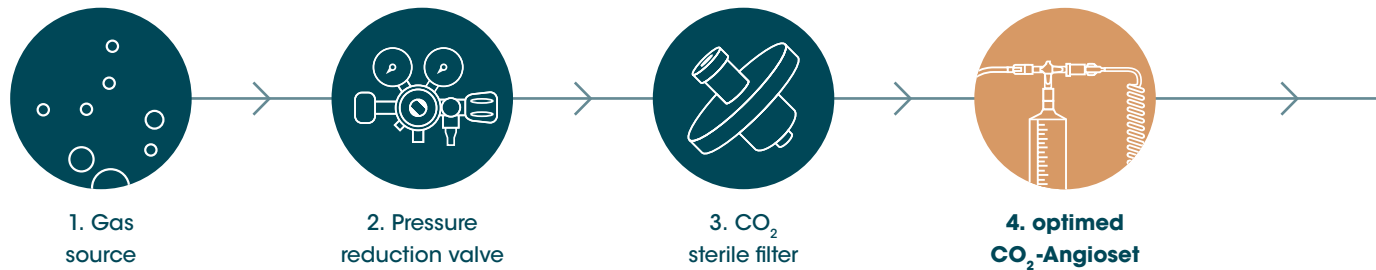
Angiography



foot

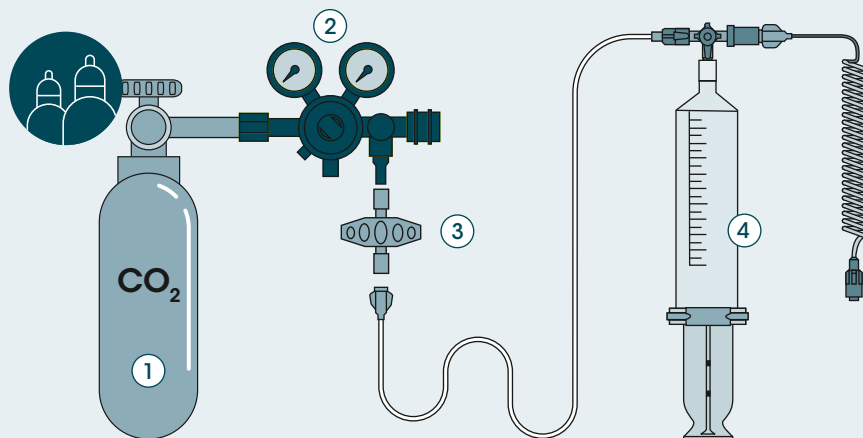


CO₂ ANGIOGRAPHY WORKFLOW



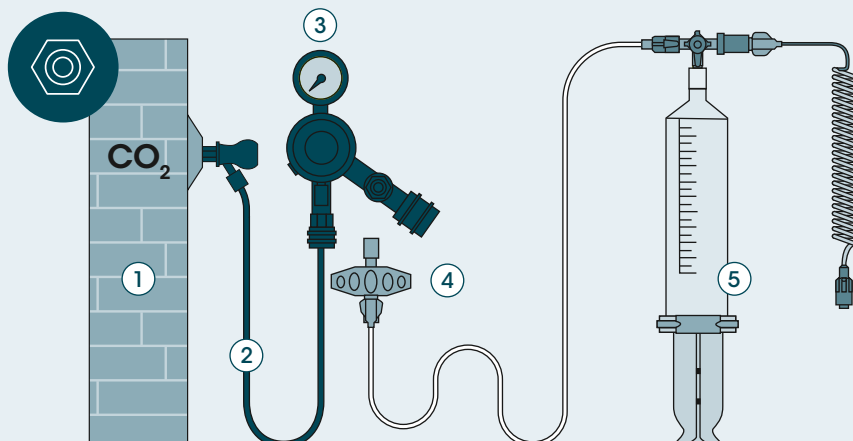
CO₂ ANGIOGRAPHY SETUP

OPTION A: SET-UP WITH CO₂ GAS BOTTLE

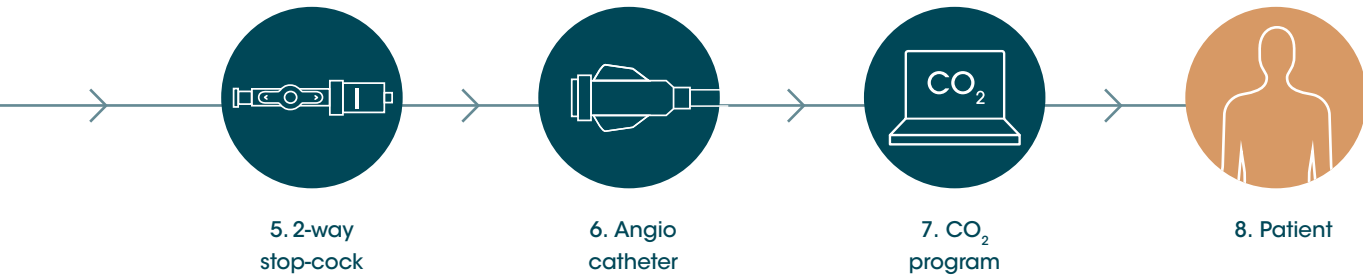


- ① Pure medical carbon dioxide (99.5 vol. % or higher)
- ② Pressure reduction valve (preset to 1.3 bar)
- ③ Sterile filter (recommended)
- ④ CO₂-Angioset

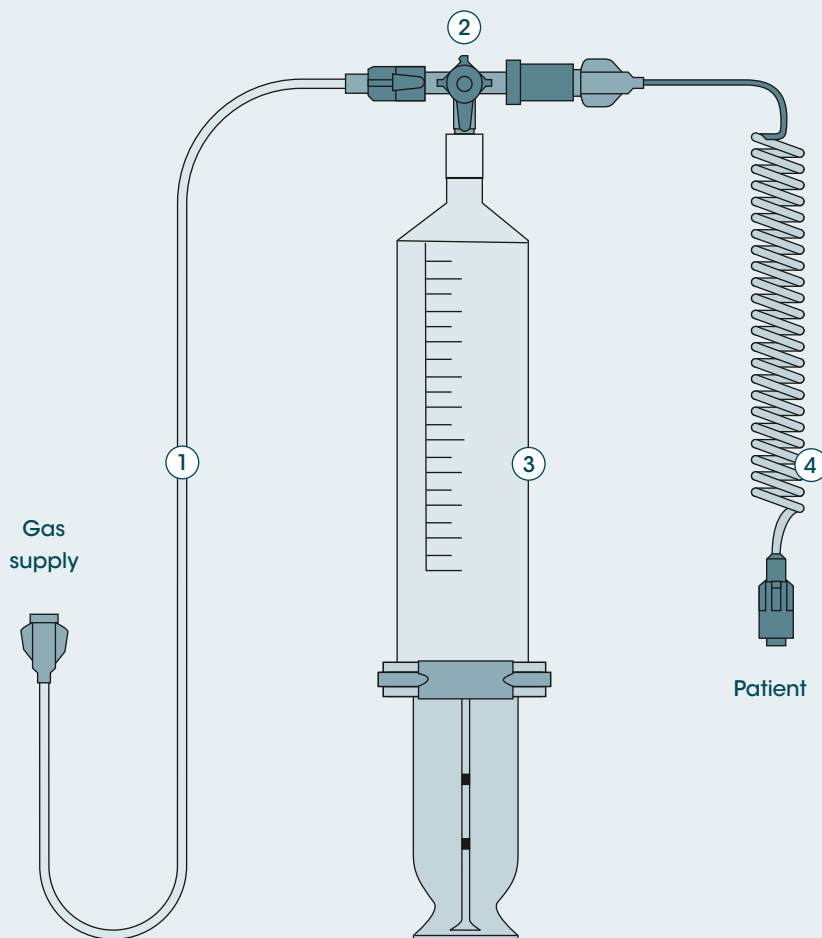
OPTION B: SET-UP WITH CO₂ CENTRAL GAS SUPPLY



- ① Pure medical carbon dioxide (99.5 vol. % or higher)
- ② Tube (length 6 m)
- ③ Pressure reduction valve (preset to 1.3 bar)
- ④ Sterile filter (recommended)
- ⑤ CO₂-Angioset



PRODUCT & ORDER INFORMATION



- ① Gas supply line, 1.5 m length with connection to the pressure relief valve
- ② Special stop-cock with 90° rotary valve for injection and loading procedure
- ③ 100 ml syringe (dose chamber adjustable setting in 20 ml steps)
- ④ Connection tube to the patient, 1.5 m length

Order Code	Description
2100-0000	CO ₂ Angioset



Packing unit:
1 piece

YOUR PATIENT IS THE FOCUS OF OUR EVERYDAY ACTIONS

Optimed, based in Ettlingen (Germany), has been engaged in research, development, manufacturing and worldwide distribution of high-end medical products for minimal invasive therapy since 1996. More than 200 employees in our headquarters, production facilities and our global sales teams ensure every day that we provide you and your patients with the highest quality medical devices.



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