CARBON DIOXIDE ANGIOGRAPHY FOR RENAL FAILURE AND IODINE INTOLERANCE (CONTRAST)

Tursunov Jakhongir Tojiboevich
Clinic "Jacksoft MDS", Tashkent, Uzbekistan

Purpose of the study: to study the possibility of clinical application of medical carbon dioxide as an alternative contrast agent for imaging the arteries of the lower extremities. During the period from December 2020 to August 2021, 33 patients aged 52 to 78 years (with an average of 64 years-old) underwent 24 aortoarteriographies using medical carbon dioxide as a contrast agent. Such use of medical carbon dioxide allows obtaining high-quality contrasting of the vascular canal and in some cases has an advantage over the use of water-soluble contrast agents.

Material and methods. From December 2020 to August 2021, 33 patients aged 52 to 78 years (average 64 years-old) were experienced angiographic studies, in which medical carbon dioxide was used as a contrast. The studies were carried out on a modern angiograph (Philips) in the DSA mode.

Results. With the introduction of carbon dioxide into the infrarenal part of the aorta, due to the high buoyancy of the gas, in all cases, its spread to one degree or another in the retrograde direction into the thoracic aorta was noted, which caused the refusal to use CO_2 in angiographic studies above the diaphragm.

When carbon dioxide was injected into the right external iliac artery, retrograde gas propagation with simultaneous contrasting of the aorta and contralateral iliac and femoral arteries was revealed. This fact makes it possible to perform angiographic studies on an outpatient basis by the puncture method through a thin pediatric needle.

The volume and rate of introduction of carbon dioxide to obtain a high-quality angiogram was established empirically, starting from a few cubic centimeters of CO_2.

For example, to obtain a high-quality angiogram of the aorta-iliac segment with a catheter installed above the renal arteries, it is necessary to inject 50 ml of CO_2 at a rate of 40 ml/s. For an adequate image of the iliac-femoral segment with a catheter installed at the level of the aortic bifurcation, 35–40 ml of CO_2 is required at a rate of 40 ml/s. For high-quality visualization of the femoral arteries with selective administration, a smaller volume of carbon dioxide (20–25 ml) is required. When injected into the superficial femoral artery, CO_2 spreads above the injection site and the deep femoral artery was filled with visualization of the smallest collaterals. With selective injection, good visualization of the renal artery was achieved using CO_2 in a volume of 10 ml.

All patients noted the appearance of a sensation of warmth along the spread of carbon dioxide, and four (17%) of 23 patients indicated short-term paresthesia in the lower extremities.

Due to its high buoyancy and a much lower viscosity of CO_2 in comparison with conventional iodine-containing CAs, it is possible to contrast the smallest collaterals in both arterial and venous systems.

It should be noted that high-quality visualization of the lower leg arteries was achieved by lifting the lower limb; the angle of elevation was 25–30 °. Due to the aforementioned unique properties of carbon dioxide, despite the presence of obstacles to propagation in the form of occlusions and numerous stenosis, a high quality contrasting of the leg arteries was obtained.

The physical properties of carbon dioxide are fundamentally different from the properties of standard iodine-containing liquid CAs. This must be taken into account for the safe and effective use of medical carbon dioxide in a clinical case.

Conclusion. When performing aortoarteriography, carbon dioxide can be considered as a real alternative to iodine-containing contrast agents. In terms of the contrast quality, it is close to these

substances, while it does not cause allergic reactions, which makes it possible to use CO2 in patients with hypersensitivity to iodine-containing CVs.

It is safe to use carbon dioxide in patients with the risk of developing contrast-induced renal failure.

Thus, indications for carboxyangioraphy can be considered: the risk of contrast-induced renal failure; allergic reactions to iodine-containing contrast agents, as well as with increased levels of urea and creatinine in this group of patients. Further accumulation of material is needed to gain a more complete understanding of the clinical significance of carboxy angiography.