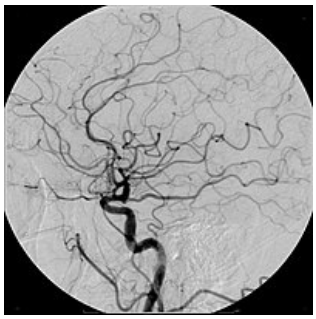
Digital subtraction angiography

Digital Subtraction Angiography (**DSA**) is one of the modern techniques used to visualize vascular bed. It is based on the digitization of the skeascopic image and the **subtraction** (**subtraction**, *difference*) of the images before and after the use of a contrast substance. Subtraction will make it possible to subtract the natively displayed structures (mainly the skeleton) and thus display only the structures with contrast substance - vessel filling. We thus obtain a highly resolved contrast, thanks to which we can image arteries even after intravenous administration of KL = **intravenous DSA**. However, KL is usually injected directly into the artery = **intra-arterial DSA**.


Cerebral Angiogram

Principle

- **1)** first a native image is made
- **2)** in the computer, this image will be converted to a negative
- **3)** a picture is then taken after KL injection
- **4)** subtraction - the image with KL is combined with the negative (without KL) - the structures are subtracted without change = only the area with KL remains

The subtracted image can be viewed as both a positive and a negative.

- The **advantages** are primarily better display, especially of sections covered by skeleton, and the use of an overall smaller amount of KL.
- **Disadvantage** can be lower spatial resolution.

Due to its predominant advantages, image quality and application possibilities, DSA is used more and more.

- **Indications**: diagnosis of vascular disease, interventional radiology (vascular, biliary tract)
- **Contraindications**: same as conventional X-ray imaging - pregnancy, and contraindications associated with the use of KL (allergy, toxicity - risk patients) and hemocoagulation disorders.

Investigation

DSA is an **invasive method,** so it is not only important to prepare the patient before the examination, but also his **follow-up**. The patient is fasting, **sufficient hydration** is important, in addition, **premedication** is given to reduce the risk of adverse reactions (allergoid, toxic), or mildly suppressive drugs or drugs that reduce blood clotting. The patient lies on a movable examination table with a mobile C-arm (x-ray), the doctor watches the examination on the screen. KL is injected into the artery through a long tube inserted using a programmable pressure injector, the point of entry depends on the examined area.

Complications during the procedure are not very frequent, they include hematoma at the injection site, thrombosis or embolization, reaction to KL, damage to the kidney – **contrast nephropathy**.

Links

Related Articles

- Angiography
- Skiascopy
- Diagnostic imaging methods in the examination of peripheral vessels
- Imaging methods in neurosurgery
- Diagnostic methods in the examination of the heart and large vessels

Sources

- JOSEF NEKULA, Miroslav Heřman, et al. *Radiologie.* První edition. Univerzita Palackého v Olomouci, 2001. 205 pp. ISBN 80-244-0259-9.