

The history of IR and its development

Interventional radiology (IR) today is a well-known medical subspecialty which performs a plethora of minimally invasive procedures with or without using imaging guidance in the process. The evolution of IR as we know it today began over 50 years ago, evolving from diagnostic catheter angiography.

Only a year after discovery of the x-ray by Wilhelm Rontgen in 1895, Eduard Haschek and Otto Theodor Lindenthal produced the first even contrast angiography (or contrast enhanced radiograph) on the veins of an amputated hand by using a mixture of chalk, mercury sulphide and Vaseline; it would take more than 20 years for contrast angiography to reach clinical practice. From the 1920s through the 1950s, it was performed rarely and only as an arteriography through a translumbar approach until 1953, when a Swedish radiologist named Sven Ivar Seldinger developed a simple technique (which we all know today as the Seldinger technique) that allowed a percutaneous placement of a diagnostic catheter. This development proved to be revolutionary because, until the development of the Seldinger technique, only large needles or trocars were used for accessing the vascular system to perform an angiography.

With the Seldinger technique, angiography in radiology flourished and catheterisation gained popularity in Europe and abroad. However, it was not the Seldinger technique that propelled the development of interventional radiology. It was actually the work of Charles T. Dotter who first recognised the potential of catheters in performing minimally invasive procedures. In 1963, he first officially spoke about it at the Czechoslovak radiological congress in Karlovy Vary during his presentation "Cardiac catheterization and angiographic techniques of the future" where he concluded that the angiographic catheter can be used for more than only diagnostics. In line with this, in 1964 he published his seminal article in *Circulation* where he presented the dilatation of the superficial femoral artery stenosis in an 82-year-old woman with painful leg ischemia and gangrene – in the end, the patient left the hospital on her feet and the dilated artery stayed open until her death two and a half years later. Encouraged by the early results, Dotter continued to improve his technique and equipment by reducing the size of the dilatation catheter and starting treatment for occlusions, ultimately introducing the nowadays well-known term percutaneous transluminal angioplasty (PTA).

The term "interventional radiology" was first introduced by Alexander Margulis in his March 1967 editorial in the *American Journal of Roentgenology* at a time when treatments other than PTA using the same basic techniques were being introduced – these included abscess drainages, biopsies, central venous line insertion and others.

During the following 20 to 30 years, the complete transformation of diagnostic angiographers to interventional radiologists occurred worldwide. Novel technological developments and techniques such as stents and stent-grafts led to new indications for interventional procedures as well as the development of thrombolysis and various embolisation techniques. However, over the course of the same time, several other clinical specialities (for example cardiology) took over the devices and methods employed by interventional radiologists, which is a trend even more prominent nowadays.

Nevertheless, IR today is one of the fastest growing medical subspecialties with an ever-expanding list of minimally invasive treatments. It is also becoming a separate subspeciality from diagnostic radiology in an increasing number of countries and in the future will assume a more clinical approach regarding patient care. As a result of all this, it is also one of the most popular medical subspecialties and our goal should be to promote and expand the knowledge of IR and its possibilities not only among medical students and residents but also among the general population.

References:

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