

Nomination to the:

SARTA MEDSTART CLAIRE POMEROY AWARD

Person being Nominated:

John P. McGahan, M.D.
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Nominator:

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I am nominating Dr. McGahan as a pioneer in the invention of radiofrequency ablation (RFA) for cancer treatment. Dr. McGahan was the first to propose and develop RFA technology for the percutaneous treatment of tumors, with the following landmark publication in 1990:

McGahan JP, Browning PD, Brock JM, Tesluk H, Hepatic ablation using radiofrequency electrocautery, Investigator Radiology 1990: 72(4) 495-500

While initially studied for the treatment of liver cancer, the use of RFA has broadened and this ablative technology is now used both percutaneously and intra-operatively for the management of a large number of cancers, including osteoid osteoma, lung tumors, renal cell carcinoma, breast cancer ablation, etc. Dr. McGahan's pioneering research on the development of RFA was initially performed in animals and in liver specimens, and then was translated to humans. Dr. McGahan has since performed RFA on over 300 patients at UC Davis.

Radiofrequency ablation involves the positioning of a needle, typically percutaneously but also intraoperatively, such that the end of the needle is placed at the center of the lesion to be ablated.

Placement accuracy of the needle can be confirmed under image guidance, typically using ultrasonography or computed tomography. RFA is one of the first and more successful examples of the many technologies that can now be described as *image guided intervention*. Once the accuracy of the RFA needle is confirmed, the electronics connected to the needle delivers current which causes intense radiofrequency radiation to be emitted at the tip of the needle. The local tissue absorbs this RF energy and is heated. The successful treatment of cancer usually involves temperature increases of 70° C for over 10 minutes. Unlike surgery, RFA does not require general anesthesia and is performed under conscious sedation with local anesthesia, which is far less traumatic for the patient, and a fast, cost effective treatment overall.



In a 2006 Editorial entitled “Radiofrequency Ablation: The Future is Now” in the American Journal of Roentgenology (AJR) [[article attached](#)], Dr. Brian Lucey states:

“The early articles reporting radiofrequency ablation in the liver were published in the early 1990’s [1-3]. These studies set the state for the procedure, but even these reports are buried among the multitude of radiofrequency articles dedicated to cardiac ablations at that time.”

where references 1 and 3 were Dr. McGahan’s papers, the first one cited above. A PUBMED search of the words “radiofrequency ablation” in the title of peer reviewed publications returns 3,183 citations, only 3 of which were published in 1989 (and none before), and these three were all using RF ablation for cardiac electrophysiology applications. Radiofrequency ablation is now mandatory training in all interventional radiology fellowships, and its use has broadened from the United States and Europe to all parts of the globe. World wide, It is estimated that between 500 to 800 RFA treatments are performed each day on cancer patients.

RFA as a treatment option in cancer management has had a dramatic impact in the prognosis for cancer patients – initially used when surgery was not considered to be an appropriate treatment option (e.g. in a patient with metastatic disease), RFA is now used routinely and serially in many patients. Initially used to extend life for months, the use of RFA in some patients can lead to many years of extended, high-quality life.

Since his initially invention of RFA for cancer, Dr. McGahan has continued to improve the basic technology – initial RFA needles were single needles, which could be used with one percutaneous approach to treat small lesions. Dr. McGahan worked with manufacturers to develop multi-wire RFA devices, which deploy an array of RFA heads using one percutaneous access point. These multi-wire systems are capable of ablating much larger tumors, which opens up this relatively non-invasive procedure to larger patient populations.

In summary, the invention of radiofrequency ablation for cancer treatment has been widely attributed to John McGahan. Twenty years after its introduction for cancer treatment, it is estimated that RFA technology is now used on over one hundred thousand patients each year across the globe – with an obvious huge impact on the lives of these patients. Because the procedure is far less invasive and costly as open surgery, RFA has had a dramatic positive affect in the processes of care delivery. It is clear that Dr. McGahan’s ingenuity in adopting this procedure to cancer therapy has had an enormous impact in cancer medicine, and for this reason I am extremely proud to nominate him for the SARTA MedStart Claire Pomeroy Award.



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