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This Week's Citation Classic

Almgård L E, Fernström I, Haverling M & Ljunggvist A. Treatment of renal adenocarcinoma by embolic occlusion of the renal circulation.
Brit. J. Urol. 45:474-9, 1973.
[Depts. Urology, Diagnostic Radiology and Pathology, Karolinska Sjukhuset, Stockholm, Sweden]

A method is presented using autologous muscle suspension mixed with contrast medium and injected via a catheter into the renal artery. In cases of renal adenocarcinoma this will produce a reduced vascularity and widespread necrosis. Troublesome bleeding ceased and tumours were accessible for surgery. The technique was free from serious complications.- [The SCI® indicates that this paper has been cited over 125 times since 1973.]

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"Renal adenocarcinoma is in many ways a peculiar disease. For instance, spontaneous regression has been reported after nephrectomy. This has been the main reason why nephrectomy is performed even in cases of metastases. The situation may also be complicated by troublesome bleeding in the urinary tract. Once I had to face a similar situation. Due to troublesome bleeding, ligation of the renal artery was recommended. From a technical point of view the operation was not at all easy. This was due to invasion of tumour tissue around the artery. Afterward, I thought that there must be some other way to stop the circulation in the kidney.

"Experience with renal transplantation and vascular studies of the kidney had taught me that the kidney has end arteries. Two reports[1,2] using muscular tissue in the treatment of arteriovenous malformations in the cerebral region influenced me to use muscular tissue to stop the renal circulation.

"Experiments on dogs and angiographic studies confirmed that small pieces of muscular tissues injected into the artery could cause an embolization. Sephadex and Spongostan were also tested for the embolization.

"After one and a half years of experiments on dogs, the first clinical case was performed. The results of the clinical trials were good and the preliminary report was presented at the French Urological Society in Paris in 1971.

"The preliminary report and the article in the *British Journal of Urology* seemed to have initiated continuous work in the field of embolization.[3,4] The technique is now used in several fields of medicine, mainly in connection with oncology. In a follow-up study on embolization, I presented the idea of combining embolization with cytotoxic therapy. A method has now been presented by colleagues in Malmö; in selected cases they use temporary occlusion combined with cytotoxic drugs. During the occlusion the cytotoxic drugs are released from the tumour tissue, thereby reducing the cytotoxic effect on bone marrow and liver.

"I believe that this publication has been highly cited mainly due to the fact that embolization facilitates surgery or offers acceptable palliation in several tumour cases."

1. **Robles C & Carrasco-Zanini J.** Treatment of cerebral arteriovenous malformations by muscle embolization. *J. Neurosurgery* 29:603-8, 1968.
2. **Sedzimir C B & Occleshaw H V.** Treatment of carotid-cavernous fistula by muscle embolization and Jaeger's maneuver. *J. Neurosurgery* 27:309-14, 1967.
3. **White R I.** Arterial embolization for control of renal haemorrhage. *J. Urology* 115:121-2, 1976.
4. **Buzelin J M, Bourdon J, Mitard D, Buzelin F & Auvigne J.** L'embolisation de l'artère rénale. Étude expérimentale. Application au traitement des cancers du rein. *J. Urol. Nephrol.* 80:541-53, 1974.