

This Week's Citation Classic

Lang E. A survey of complications of percutaneous retrograde arteriography (Seldinger Technique). *Radiology* **81**:257-63, 1963.
[Department of Radiology, Methodist Hospital, Indianapolis, IN]

The incidence of complications attendant to percutaneous retrograde arteriography is established on the basis of a survey tabulating 11,402 procedures. Contributing factors and underlying cause for the principal serious complications are identified, and potential modes for prevention or management of complications delineated. [The SCJ® indicates that this paper has been cited over 185 times since 1963.]

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March 22, 1978

"The frequency of citation of this paper may well reflect its impact on wide acceptance of percutaneous retrograde arteriography in today's medical practice. While the diagnostic value of arteriography had been duly recognized for some time, the complexity of this procedure, and its attendant high rate of complication, had curtailed widespread use of this technique. Retrograde percutaneous arteriography offered for the first time a technically simple procedure to obtain this goal. Initially, however, acceptance of this valuable technique was restrained by the then unknown but often overestimated incidence of complication accompanying this procedure.

"On the basis of a large survey, the above treatise established in an authoritative fashion the true incidence of complications attendant retrograde percutaneous arteriography. The surveyed institutions represented a wide cross section of types of medical practice in this country and Canada. The established rate of mortality of 0.06% and of major complications of 0.7%, once forever, laid to rest apprehensions of a prohibitively high and hence unacceptable complication rate.

"With this restriction removed, the use and deployment of percutaneous retrograde arteriography experienced an unprecedented increase. The procedure, formerly primarily available in tertiary care centers, became now

widely practiced in all community hospitals. The resultant enormous numerical experience identified new applications for this valuable technique. The facility for selective engagement of subsegmental vessels of deep seated organ systems suggested use as a therapeutic pathway to such remote segments. Selective perfusion with chemotherapeutic agents, selective embolization with radioactive infarct particles or embolization with inert material to curtail hemorrhage, all via a transcatheteral route, were added to the well established diagnostic applications of retrograde percutaneous arteriography.

"Much of the credit for acceptance of percutaneous retrograde arteriography for diagnostic and now therapeutic purposes, however, must be given to the authoritative and meticulous treatise establishing the safety of this technique at a time of early fields trials in their infancy."