

## A NEW TECHNIQUE FOR THE ARTERIOGRAPHIC EXAMINATION OF THE ABDOMINAL AORTA AND ITS BRANCHES\*

By DR. P. L. FARÍÑAS  
HAVANA, CUBA

AFTER the publication of the paper by Dos Santos (1929) describing a technique for the arteriographic study of the abdominal aorta, different communications on the subject have appeared, but his method has not become a routine procedure in general practice due to the difficulties of the blind puncture of the abdominal aorta at the paravertebral region.

In order to avoid the blind puncturing of the aorta, we recommend the arteriographic study of the abdominal aorta and its branches by the puncture and catheterization of the femoral artery at Scarpa's triangle. After local anesthesia the femoral artery is exposed by blunt dissection, mounted in two catguts, and punctured with a trocar through which a catheter is

passed, it being introduced to the desired level in the aorta. The patient is placed in position according to the organ to be roentgenographed so that its selective arteriogram may be obtained. A compression at the root of the opposite member is made

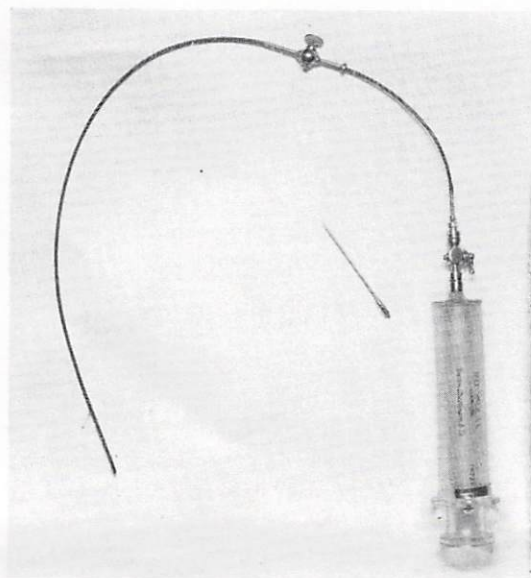


FIG. 1. Necessary instruments: urethral catheter No. 7 or 8 Porges; trocar with stopcock, and a 50 cc. syringe with adaptor and stopcock.

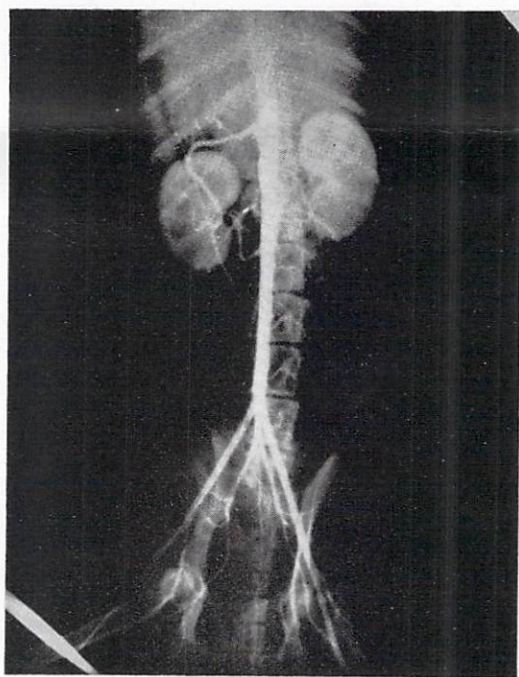


FIG. 2. Aortography by catheterization of the femoral artery. Anteroposterior view showing the abdominal aorta and its branches in a dog.

with a tourniquet, in order to compress the femoral artery and to obtain an ectasis in the abdominal circulation.

After the preliminary details are completed, 20 or 30 cc. of a 70 per cent solution of diodrast is injected within two to three seconds through the catheter, and a fast Potter-Bucky film is made. This gives a

\* Read at the Forty-first Annual Meeting, American Roentgen Ray Society, Boston, Mass., Oct. 1-4, 1940.

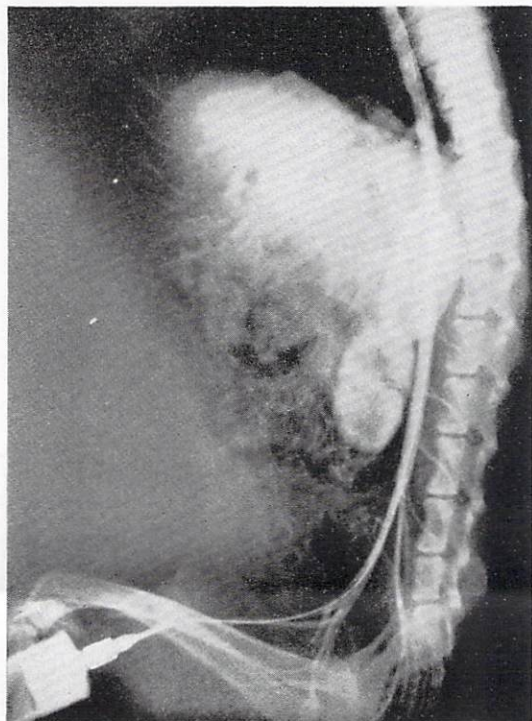


FIG. 3. Aortography by catheterization. Lateral view showing the mesenteric plexus and the lumbar arteries in a dog.

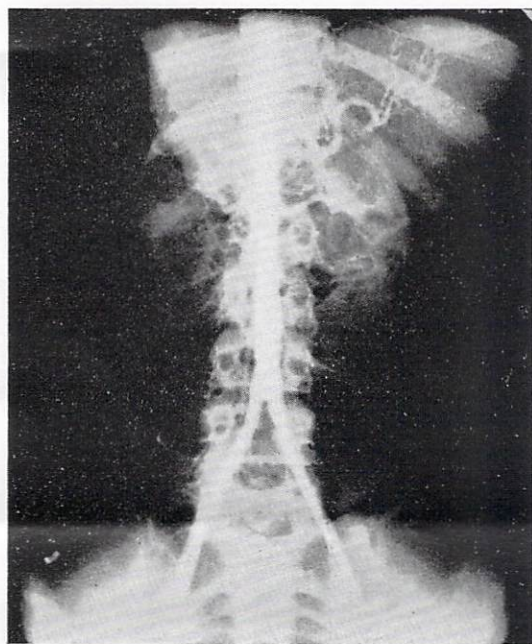


FIG. 4. Aortography by catheterization of the femoral artery. The aorta and its branches are clearly visible. Note the mesenteric plexus.

concentration of 8 to 10 per cent of diodrast in the aorta. The catheter and trocar are then withdrawn and a suture taken in the adventitia of the artery at the site of the puncture and the wound is closed. Using the same injection, a urogram is taken, making plates of the urinary tract after the catheter has been withdrawn.

While trying to use the arterial system in the treatment of cancer of the abdominal

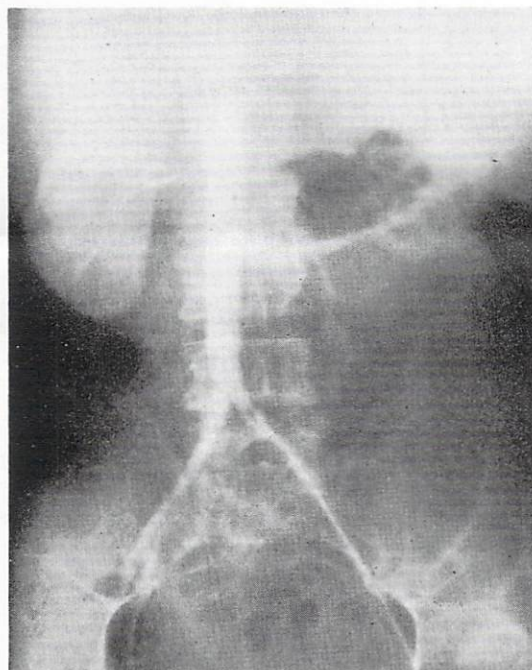


FIG. 5. Selective arteriography of the left kidney. The catheter was placed at the level of the first lumbar vertebra and the patient inclined to the left. The renal arteries are normal.

organs, we started using the puncture of the aorta at the paravertebral region, as recommended by Dos Santos. However, as a result of the difficulties of the blind puncture of the aorta combined with the necessity of having a desired concentration of some substances in the affected organ, the catheterization method under discussion was conceived and employed at the Cancer Institute in Havana.

We started using this method in dogs, and their autopsies did not show any early or late alterations which could be attribut-



ed to the puncture or catheterization of the arteries.

We have had no accidents due to the injection, which is absolutely painless, and patients are able to walk to their beds after the injection. Their autopsies showed no lesions due to the catheterization of the aorta.

The study of the abdominal organs by

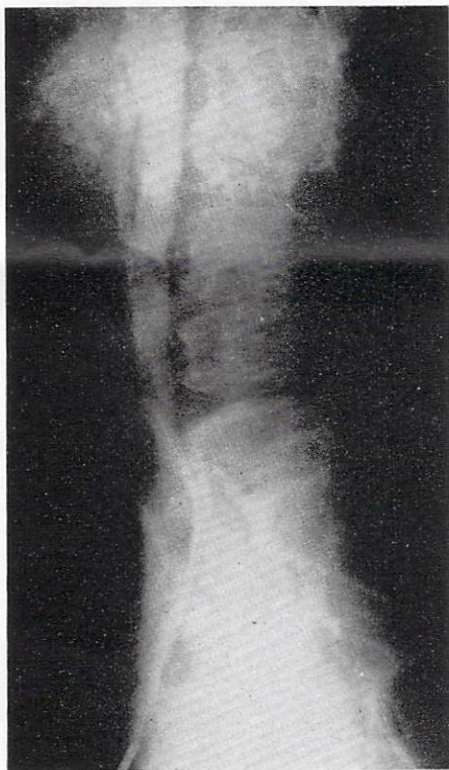


FIG. 6. Aortography by catheterization of the aorta. Lateral view in a man.

arteriography gives a great deal of information concerning the anatomical and functional disorders through the modification of the circulation. The alterations in the wall of the aorta and its branches; the study of the renal circulation by its density (secretory function), and by urography (excretory function) with the same injection; the location of abdominal tumors and many obscure problems of the abdominal cavity may be observed by this method.

By employing this technique, a selective study of the circulation of any abdominal

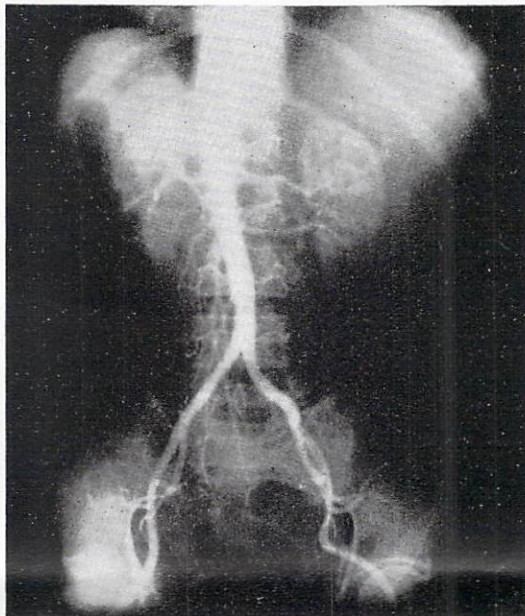


FIG. 7. Abdominal Hodgkin's disease. Note the multiple compressions of the aorta and its branches by enlarged glands.

organ may be made by placing the end of the catheter close to where its artery leaves the aorta, and correct positioning for roent-

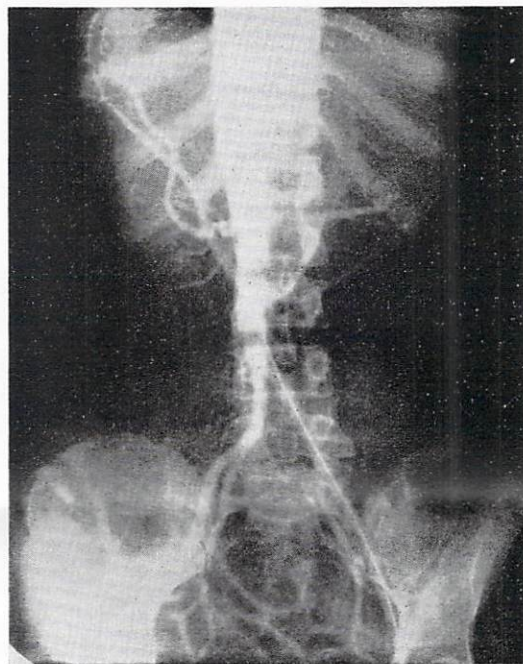


FIG. 8. Very large tumor of the liver. Absence of the hepatic artery and the displacement of its branches.



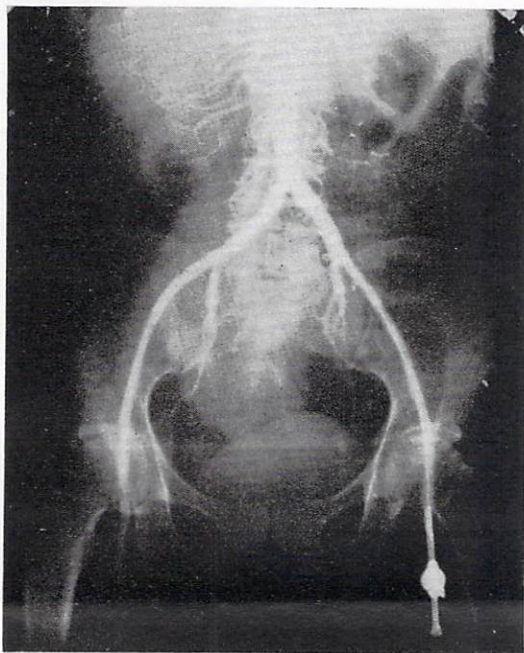


FIG. 9. Large tumor of the uterus. Note the neoplastic vessels and the displacement and compression of the arteries by the tumor.

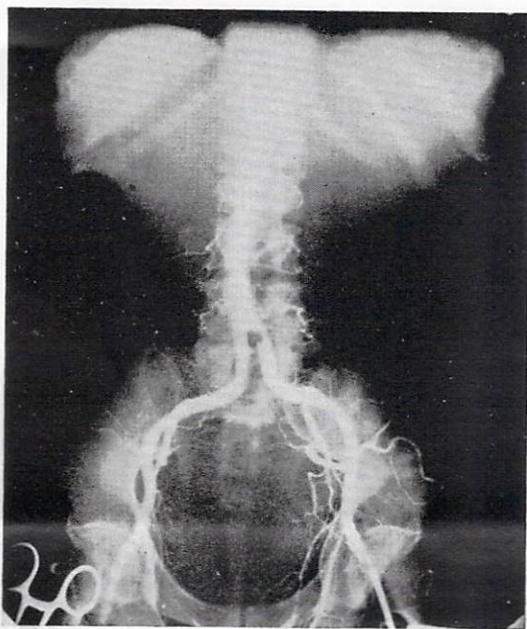


FIG. 10. Very large tumor of the bladder. Note the displacement of the iliac arteries and the newly formed vessels of the tumor.

genography. We hope that this method will be used wherever indicated, as a substitute for blind puncture of the aorta.

#### DISCUSSION ON PAPERS BY STEWART, BREIMER AND MAIER, AND FARIÑAS

DR. C. SIDNEY BURWELL, Boston. The two very instructive papers—one by Drs. Stewart Breimer and Maier, and one by Dr. Fariñas—lead me to make the following comments:

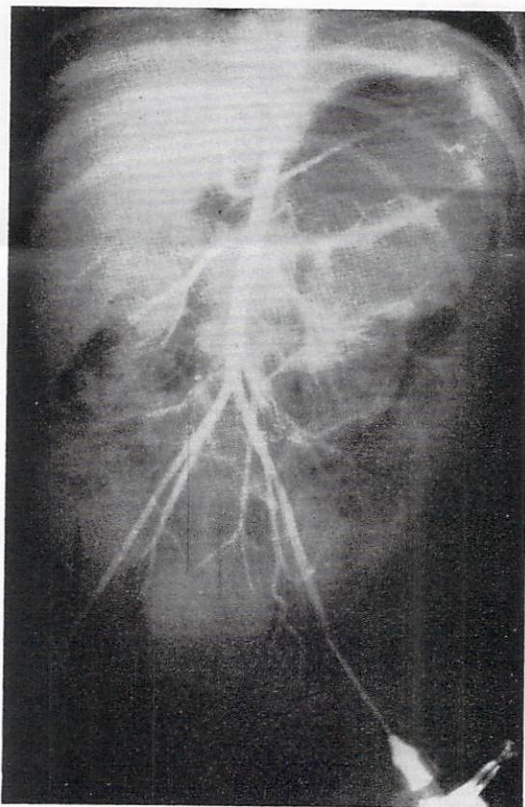


FIG. 11. Large suprarenal tumor on the left side with displacement of the splenic artery. Note the enlargement of the capsular artery on the left side and the new circulation into the tumor.

First, there is no doubt that useful visualization of the heart and great vessels is much aided by the injection of diodrast and the taking of films in rapid succession after such an injection. From such observations come not only useful aid in the diagnosis of individual cases, but also definite additions to our knowledge of the circulation through the heart, great vessels, and lungs. This knowledge may reach the point



where simpler methods will serve for the diagnosis. This is the natural history of many diagnostic methods.

Second, diagnosis in a given patient may be important because it serves as a guide to treatment, because it supplies an answer to the question of prognosis, or because it satisfies the doctor's curiosity. I do not decry this last, which is essential to scientific progress, but the degree of risk which it is proper to assume will vary according to the significance of the information to be obtained. This observation applies to all diagnostic procedures. As the risk increases, the importance of the information to be obtained from the point of view of guiding in the essential treatment of the patient must also increase, and crucial risks may be taken only for crucial decisions. These observations apply to the use of diodrast. Under ordinary circumstances, the risk is small, perhaps minimal, but I cannot persuade myself that the incision of the femoral artery and the introduction of a catheter is a small procedure or one without hazard. Therefore, although such a method may be useful in studying the circulation in experimental animals, its use in patients would appear to me to be justified only by the chance of obtaining information which was decisive in indicating the patient's treatment. Moreover it would be necessary to show that decision could not be reached in a less disturbing way.

Third, there is a point which I would like to make regarding the association of other congenital lesions with patent ductus arteriosus and the bearing of this association on the desirability or undesirability of ligation. It is suggested in the paper of Stewart, Breimer and Maier that certain abnormalities of the great blood vessels and certain septal effects contraindicate surgical relief of patency of the ductus. In the first place, such association of lesions is not common in patients who survive beyond the first months of life, though not unknown. In the second place, if the patent ductus is playing a useful rôle, that is if it is serving as a necessary bypass, the patient will usually and perhaps always be cyanotic. So far I have not heard anyone advance the suggestion of a situation in

which a non-cyanotic patient needs a patent ductus. This does not minimize the value of this type of roentgenographic diagnosis of congenital and acquired heart disease. Additional precision in the diagnosis of congenital heart disease is much needed since in this group there are patients who may benefit greatly by appropriate treatment.

Finally, may I express my gratitude for the opportunity of meeting with this Society and discussing these problems of importance to students of the circulation. Cooperative interest and discussion are surely important factors in the advancement and diffusion of knowledge.

DR. STEWART (closing). So far as the risk is concerned, we have had no serious trouble. Some patients have a little nausea—nearly all a sense of heat which follows almost immediately after the injection—others have an acute urticaria which disappears in a short time. One or two felt a little faint, attributed more to fright than any ill effects of the iodine. We now inject in the recumbent position; this overcomes much of the anxiety.

Our experience, of course, is somewhat limited compared with that of Robb and Steinberg who report no serious ill effects in over 500 injections.

I believe, with Dr. Burwell, that the procedure should be limited to those cases in which a diagnosis cannot be made by any other method. This applies more particularly to congenital heart disease.

DR. FARIÑAS (closing). We conceived the method of introducing a catheter through the femoral artery into the aorta as far as the place where the catheter's free end would lie directly in front of the arterial pedicle of an organ affected with a neoplastic process with the purpose of introducing into this organ different highly concentrated substances with which we are experimenting. We now use this method not as a routine procedure but in those instances in which it is not possible to arrive at a definite diagnosis of lesions located in the aorta, its branches or abdominal organs by any other method of examination.

