

# Point on the Trans Renal Express Window

TREW

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**Abstract** Duplex examination of the renal arteries presents technical difficulties due to their depth, the interposition of intestinal gases, movements transmitted to the abdominal wall and kidneys by respiratory movements, and the width of the angle of incidence of the Doppler beam. These difficulties can be considerably reduced by a scanning window called trans-renal express (TREW).

**Keywords** Renal artery, Renal hypertension, renal Duplex assessment, abdominal Duplex, Renal artery Doppler.

Duplex scanning of the renal arteries is often limited or even prevented by the interposition of the gas-filled intestines and by the respiratory movements of the diaphragm which mobilize the abdominal wall, the kidney, and the renal artery.

These disadvantages require a diet without residue the day before the examination and apnea which is not always easy in dyspneic patients during the examination<sup>1,2</sup>. (Figs 1-5)

Trans-renal express window (TREW) removes the obstacles to the investigation of the renal arteries which are Gas, Mobility of the kidney, Respiratory movements, and Doppler measurement errors due to incorrect angulation.

The anterior window in the supine position is blinded by gases, respiratory movements and the angle of incidence of the Doppler beam which is too open, almost 90 degrees. (Fig 1)

The trans hepatic access can visualize very well the right renal vessels as well as it can be done for the left renal vessels by the trans splenic access, though it is more rarely used and limited to cases of splenomegaly<sup>3</sup>.

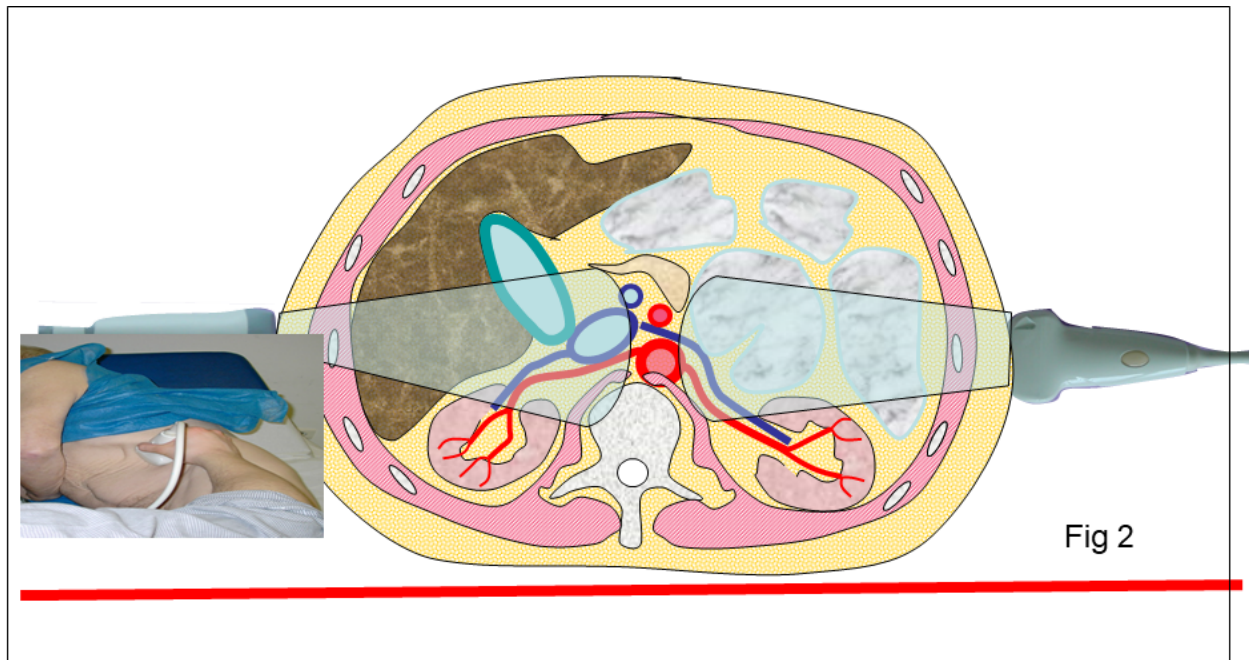
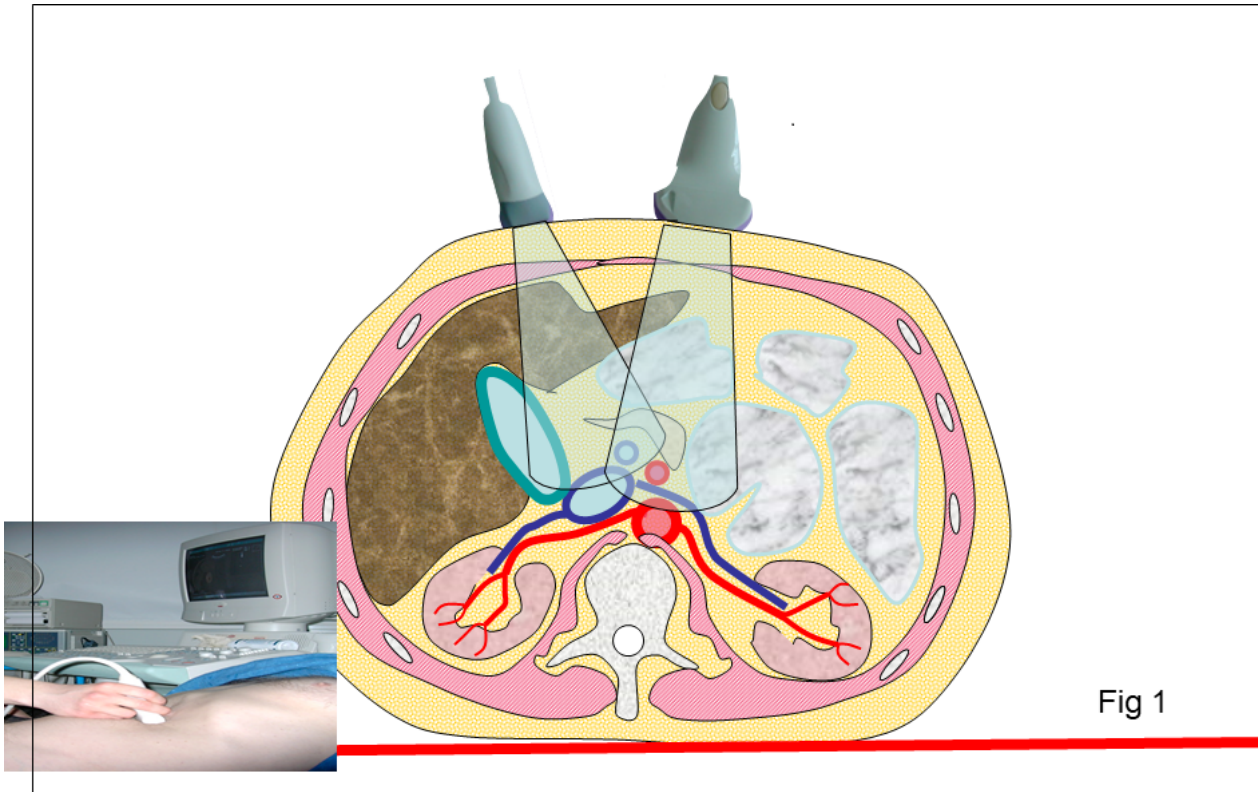
Both trans hepatic and splenic accesses require a deep inbreath with apnea to force the organs out of the costal margin, superficially to the kidneys. In addition, very often the kidneys are in a very low and deep position.

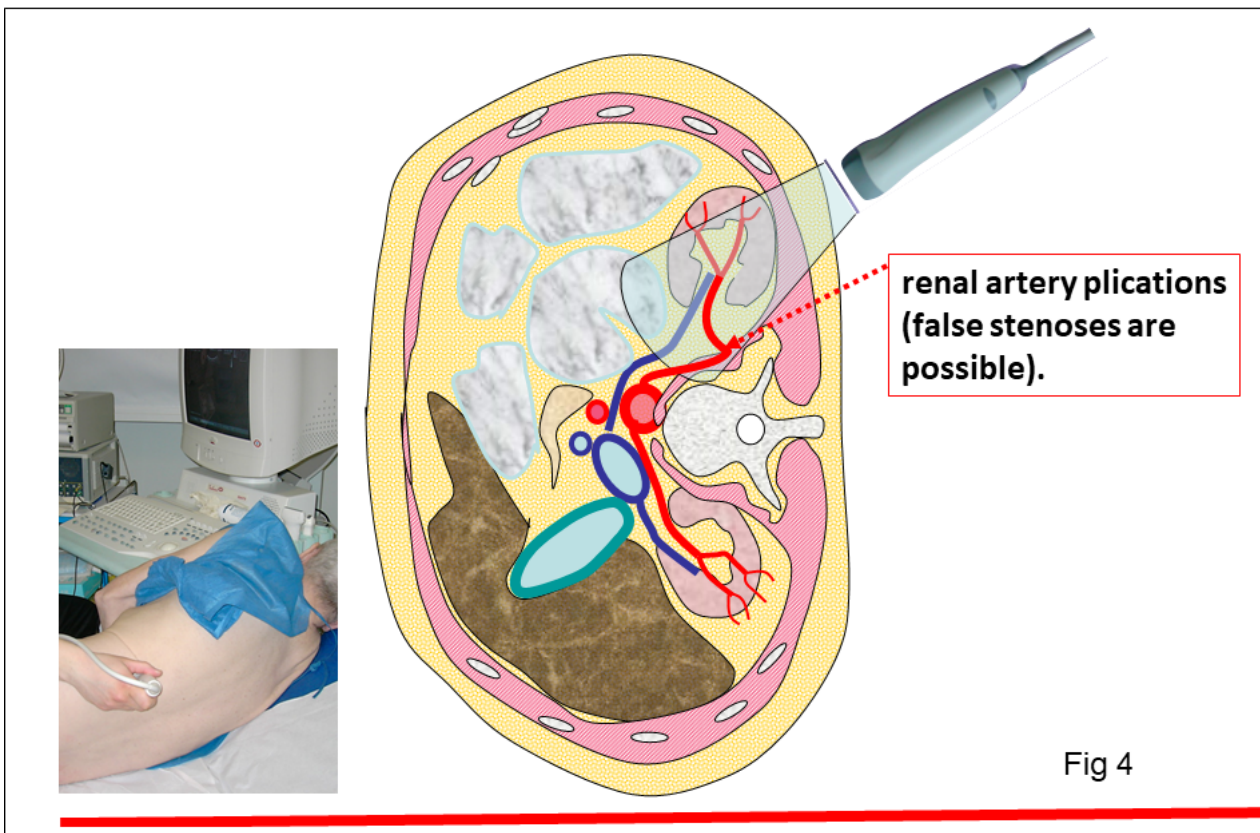
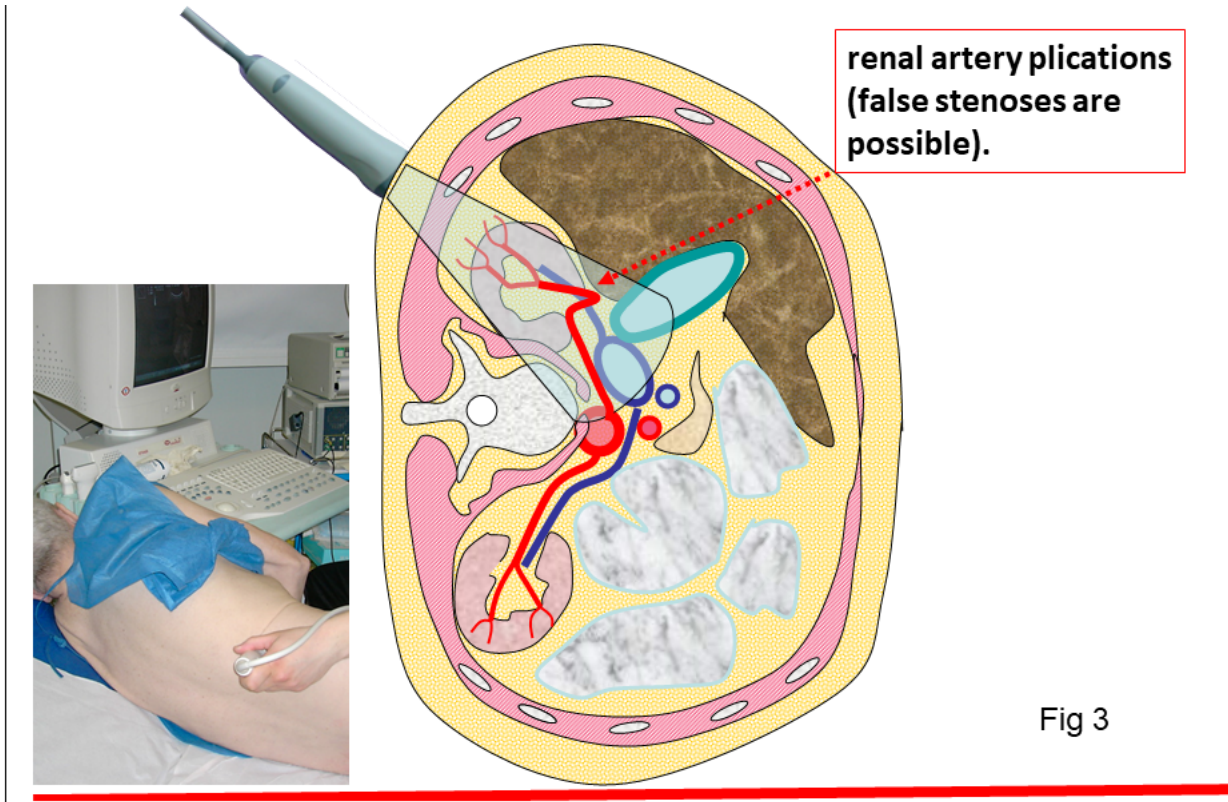
The lateral window in the supine position is blinded by gases from the left side, the respiratory movements and an open angle of incidence of the Doppler beam. (Fig 2)

In the Right and left Postero-lateral window in lateral decubitus no gas interposes, the Doppler beam angulation is optimal and there are little respiratory movements. However, the decubitus causes the mobilization of the kidney with possible false stenoses, due to renal artery plications. (Figs 3, 4)

In the postero-lateral window in supine position no gas interposes, there are little respiratory movements, still kidney and optimal Doppler angulation but this access window is NOT POSSIBLE, because the placement of the probe is impeded by the examination table. (Fig 5)

Right Trans-renal express window (Right TREW). Semi-right lateral procubitus Inclined for RIGHT KIDNEY. No interposed gas, large window optimal Doppler beam angulation, and very little or no transmitted respiratory movements (No required apnea). (Fig 6)





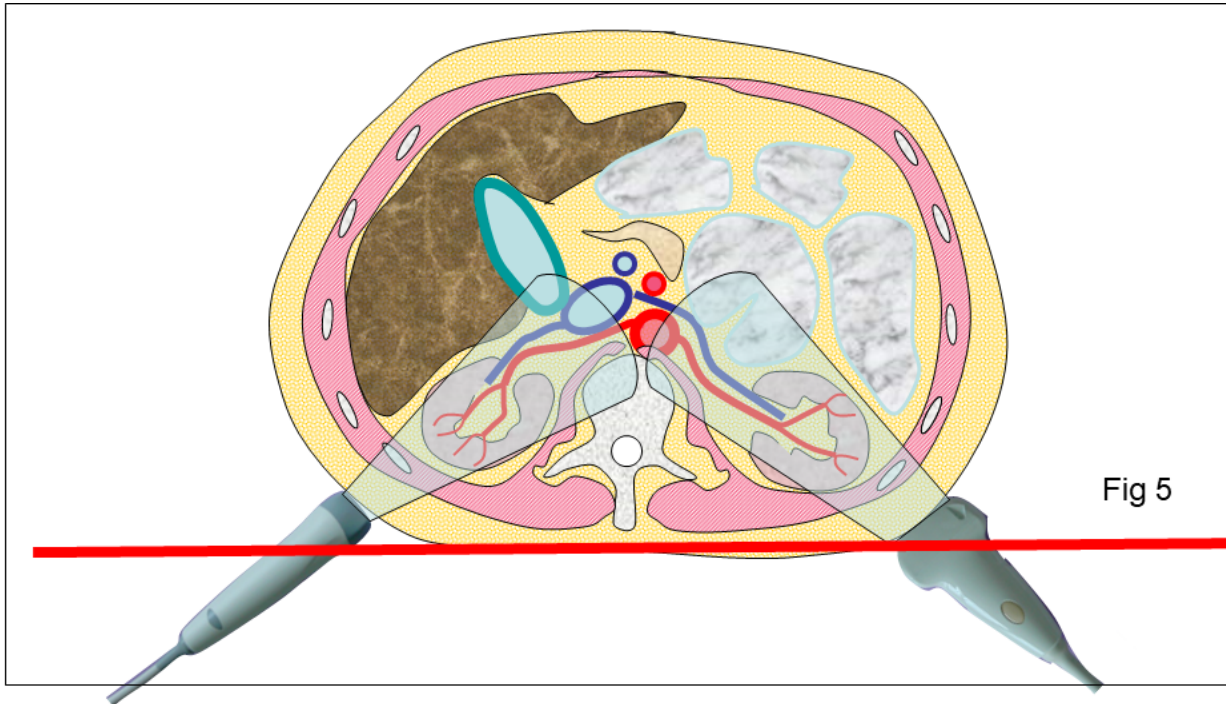


Fig 5

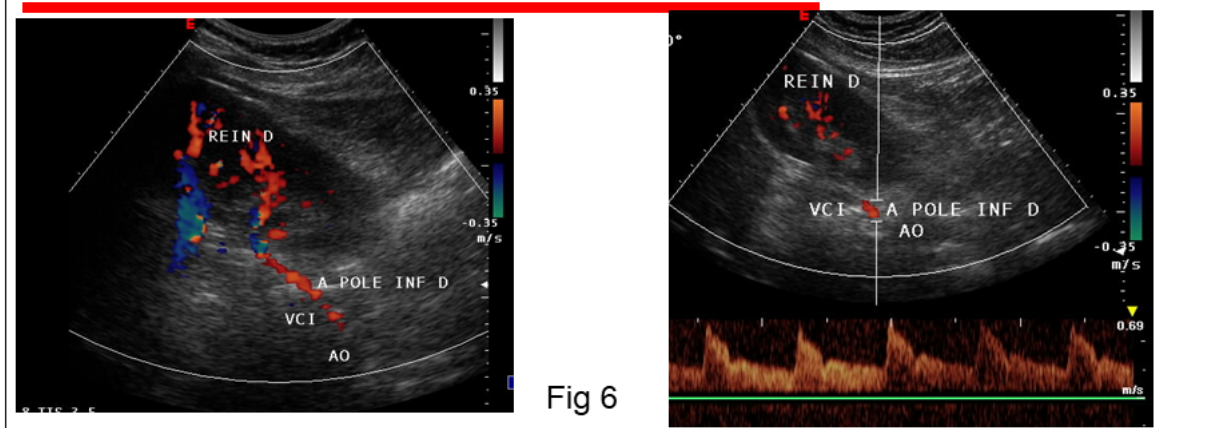
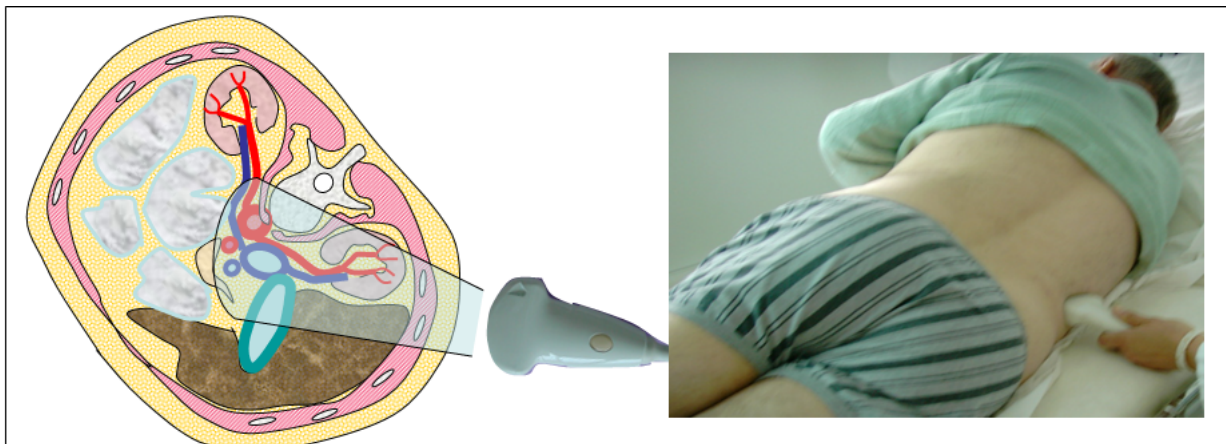
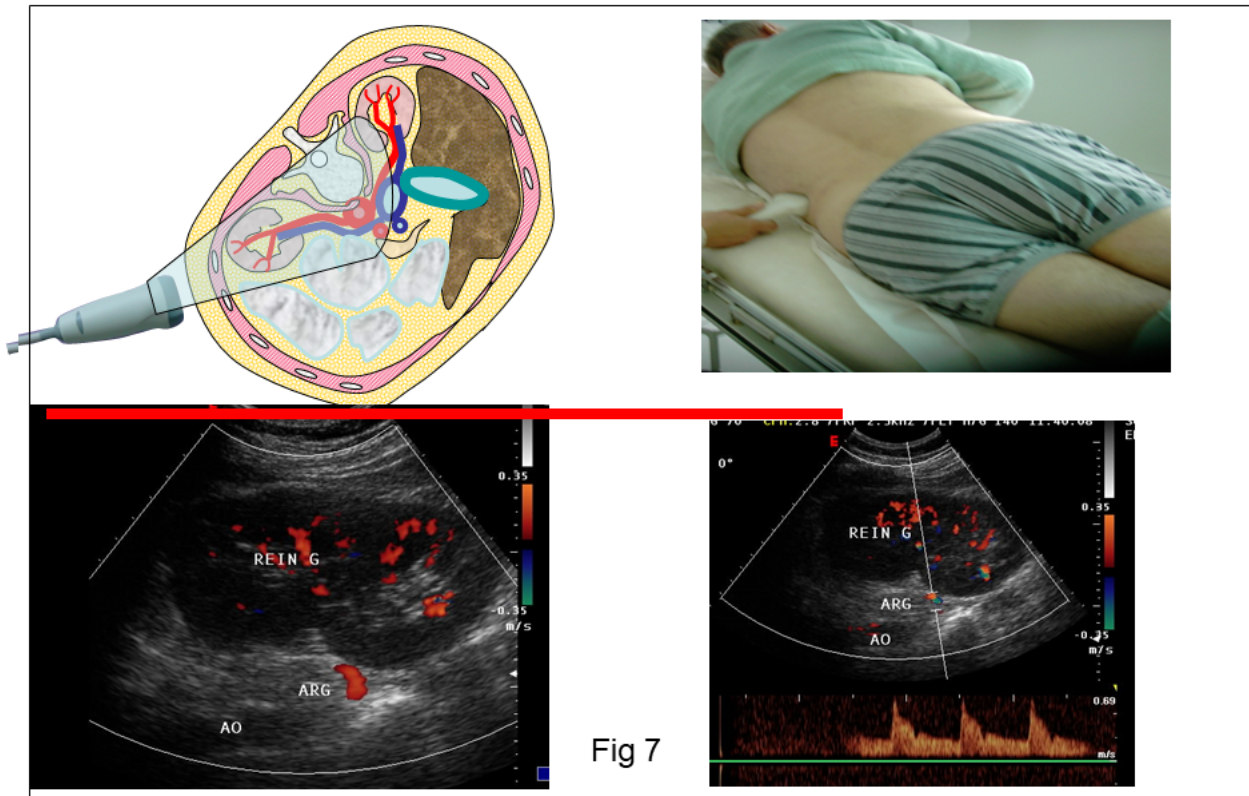


Fig 6



Left Trans-renal express window (Left TREW). Semi-left lateral procubitus Inclined for LEFT KIDNEY. No interposed gas, large window optimal Doppler beam angulation, and very little or no transmitted respiratory movements (No required apnea). (Fig 7)

Other access windows are available to explore kidneys and renal vessels:

- The postero-lateral view in ventral decubitus has an optimal angle, but kidneys move far from the dorsal surface presenting vessel plicatures. In addition, the ventral decubitus is uncomfortable to many patients and impedes a quiet respiratory activity;
- Access windows in the seated patient. When the patient is sitting, the probe can be oriented easily with any angle in the horizontal plane, especially in the postero-lateral ones (right or left), which were impossible in the supine position. However, organ movements are enhanced owing to gravity and greater diaphragm excursions. Hence, artefacts increase, reducing the advantages of the position.

Finally, whatever the adopted access method, a pulsed wave device (PW) with a sample volume as large as possible should be used. As an alternative it could be used a continuous wave device (CW), which does not require a sample volume, but a simple insonated area.

These settings are highly effective in capturing the Doppler signal from moving structures, when movements are negligible as it occurs in the TREW access windows, thus preventing the use of apnea. Indeed, the other traditional windows present much larger respiratory movements, which require the use of an uncomfortable apnea.

The transrenal express window, therefore, has the advantage of not requiring any digestive preparation or apnea during the examination, while showing the kidney and its arteries at the same optimal angle for collecting the quality Doppler signal. It is “express” because usually, this particular section incidence is sufficient to evaluate the entire renal artery and its branches at once, so it saves time. (Figs 6-7)

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