Introduction

Atherosclerotic Renovascular disease needs noninvasive diagnostic tools to apply to patients having clinical characteristics that can suggest its presence. Color Doppler ultrasonography is a noninvasive, inexpensive diagnostic procedure that is capable, in an experienced hand, of accurately screening for Reno vascular disease **(Zucchelli PC,2002).**

Peripheral vascular disorders of the kidney involve the intrarenal branches of the renal vascular tree. It include occlusive (infarction and cortical necrosis) and non-occlusive vascular lesions (acquired arteriovenous fistulas, arteriovenous malformation, false aneurysms and micro aneurysms). Initial diagnosis relies on color Doppler US **(Helnon et al ; 2004).**

Color flow Doppler provides accurate imaging and access flow volume measurement of the hemodialysis vascular access. It can readily identify subsets of patients at high risk for future thrombosis. It is noninvasive, mobile, and allows convenient clinical evaluation at the dialysis facility. In Europe, Doppler ultrasound has become the standard of care for evaluation of arteriovenous (AV) fistula dysfunction and is essential in the preoperative evaluation for access placement. It also can diagnose the arterial inflow disease that has become more prevalent in our aging, diabetic, end-stage renal disease population. Access management programs based on Doppler ultrasound have been highly successful and have produced outcome data as good or better than provided with other techniques **(Sands et al ; 2002).**

Evaluation of renal vasculature with pulsed Doppler US is useful in the differential diagnosis between perirenal ARF and acute tubular necrosis (ATN), and in the diagnosis of renal obstruction. Latest generation US apparatus allow color Doppler and power Doppler evaluation of renal vasculature up to the interlobular vessels. There are renal pathologic conditions presenting with ARF in which color Doppler US provides more specific morphologic and functional information. In particular, color Doppler US often provides direct or indirect signs which can lead to the right diagnosis in old patients with chronic renal insufficiency complicated with ARF, in patients with acute pyelonephritis, hepatic disease, vasculitis, thrombotic microangiopathies, and in patients with acute thrombosis of the renal artery and vein **(Bertolotto M et al ;2001).**

We evaluated whether color Doppler US had diagnostic accuracy and would be more informative in preoperative diagnosis of renal solid tumors (**Kitamura H et al ; 2004**).

Duplex sonography can detect the neovascularized blood vessels surrounding and penetrating the tumors. In the tumor staging the duplex is useful to demonstrate neoplastic thrombosis of renal vein and inferior vena cava **(Migaleddu V et al; 1996).**

In renal transplantation ,color Doppler is helpful to the transplant physician in detecting graft dysfunction and peritransplant collections, It is also helpful in the diagnosis of chronic vascular complications including transplant artery stenosis and arteriovenous fistula. It has no specific application in the diagnosis of chronic rejection **(Baxter GM,2003).**

Diagnostic imaging, and especially the color Doppler flow, is very effective in obtaining diagnosis of Renal failure following transplantation **(Plainfosse MC et al ;1994).**

Color Doppler and especially power Doppler can be used to evaluate parenchymal perfusion of the kidney in case of tumor or infectious pathology.

In the work-up of an acute renal failure, color Doppler can facilitate the differential diagnosis by rolling out arterial or venous cause; in case of the renal cause there is usually an increase in the resistance index.

Color Doppler sonography is widely used for the investigation of the renal arteries in search of the Reno vascular hypertension for assessing the patency,localizing the stenosis and placing the sample volume accurately in order to make optimum pulsed Doppler measurement (**L.Staert, 1995)**

In nephropathy,they suggest that duplex Doppler sonography with Doppler wave form analysis may be a useful in the evaluation of diabetic nephropathy, ischemic nephropathy in an elderly nephrologic and hypertensive population., even in the early stages and detected patients at risk for irreversible renal disease **(Sperandeo M 1996)**

The findings in renal infection are extremely variable. Renal infection may be focal or diffuse. Blood flow findings, however, depend not only on the focal or diffuse nature of the condition but also upon the influence of the balance between hyperemia consequent upon infection ,and reduced flow consequent upon renal swelling and capsular stretching. Thus there may be a global or focal increase in blood flow, with a reduction in the Doppler indices or more commonly there may be reduction in blood flow and an increase in the Doppler indices. In focal pyelonephritis, this may allow the demonstration of a hypo echoic mass with an associated perfusion defect.

The development of a renal or perirenal abscess is an uncommon complication of renal infection. The appearances are, however, fairly characteristic, with a renal mass lesion showing central necrosis subsequently developing into an irregular cystic lesion with thick walls. Blood flow is usually increased around the margin of the lesion, producing (color halo), although this is indistinguishable from a necrotic renal tumor. Usually a combination of clinical history and gray-scale features, as well as color Doppler, will allow the correct diagnosis.

In acute obstruction, however, there is often no evidence of calyceal or pelvic dilatation and the kidney may appear structurally normal on ultrasound.In this situation, However, there are alteration in intrarenal pressure consequent upon the obstruction and these may be detected by the use of Doppler techniques. This author's own experience suggests that in patients in whom an intravenous urogram is contraindicated, such as pregnancy, the combination of Doppler indices with the finding of asymmetric ureteric jets in the bladder is a reliable discriminator of ureteric obstruction.

In cases of renal trauma, Color Doppler can demonstrate reduced or absent flow to the renal parenchyma. While this will not differentiate between vascular transection or severe spasm, it does suggest the need to consider angiography. It is important to optimize color Doppler settings for the detection of low flow, and therefore institute the lowest high-pass filter together with a low pulse repetition frequency while ensuring that flash artifact is minimized. (**Paul L.Allan ,2002)**

Color Doppler examination of fetal renal vessels can facilitate the diagnosis of renal malformations. It is best to use a coronal view of the fetus, allowing visualization of the descending aorta with both the left and right renal arteries. Color Doppler is useful in the diagnosis of unilateral or bilateral renal agenesis , double arterial supply of a normal or a duplex kidney , horseshoe kidney and pelvic kidney**. .(Meizner I et al ; 1995)**

Aim of the work

To spotlight advantages and limitations of color Doppler in the evaluation of the renal disease. Illustrative cases are involved.