SUMMARY AND CONCLUSION

Kidney transplantation may be followed by a number of complications of parenchymal, urological and vascular nature. Early diagnosis of these complications may determine the survival of the graft.

As graft recipients are fragile patients and may need decisive studies for fear of allograft failure, therefore the diagnostic tool used to assess allograft dysfunction should be non invasive as possible.

This study was aimed to evaluate the role of ultrasonography, color and power Doppler in early diagnosis and follow up of post renal transplant complications.

B mode ultrasonography can give a good idea about the renal size, the thickness and echopattern of the renal parenchyma, the presence of stones, pelvicalyceal system dilatation and the presence of perinephric fluid collection. Finally ultrasonograghy can be used to guide percutaneous biopsy for diagnosis of cases with parenchymal failure.

Real time high resolution B mode ultrasonography combined with color Doppler examination is a simple, safe, non-invasive technique for evaluation of patients after renal transplant. It can be repeated daily in the early post

operative period (highly reproducible test). Duplex sonography can effectively triage patients to undergo invasive radiological or surgical procedures for diagnosis of complications as biopsy.

Color Doppler sonography, coupled with power Doppler, is very helpful in the assessment of renal vessels. It can easily diagnose renal artery stenosis, occlusion and renal vein thrombosis.

Other renal allograft complications like acute rejection, chronic rejection and acute tubular necrosis can be suspected if the Doppler study showed elevated renal vascular resistance (high resistive index) in the absence of any morphological abnormality. Final diagnosis can be reached in these patients after ultrasound guided renal biopsy.

Another potential clinical application of duplex sonography is to monitor the effectiveness of anti-rejection therapy in cases with acute rejection. This subject needs further study on many patients for better evaluation.

Case No. 1:(fig 1 a&b)

A female patient 44 years old .underwent renal transplantation on 2/10/2005.

On 6/10/2005 the patient presented with graft tenderness ,loss of diuresis and rise of creatinine level(6.2 mg/dl).

Duplex Doppler:

Duplex Doppler examination was done on 8/10/2005,revealed normal sonographic appearance of the graft ,with marked obliteration of diastolic flow .P.I. was elevated (2.40 at the level of interlobar artery),the diastolic flow was reversed at the level of segmental artery.

Scintigraphy :

Scintigraphy was done on 14/10/2005,showed absent renal perfusion,during this period the patient did not show any response to anti-rejection therapy.

Angiography:

Angiography was done on 15/10/2005,revealed marked attenuation of internal branches with poor nephrogram.

US guide biopsy:

On 16/10/2005 US guide biopsy was done ,it showed parenchymatous necrosis with hemorrhagic infilterations.

**In this case Doppler examination ,revealed presence of rejection ,Scientigraphy excludes A.T.N. However angiography ,and biopsy were essential before graft nephrectomy.

Treatment:

Nephrectomy was done on 18/10/2005.

Final diagnosis :

Hyperacute rejection.

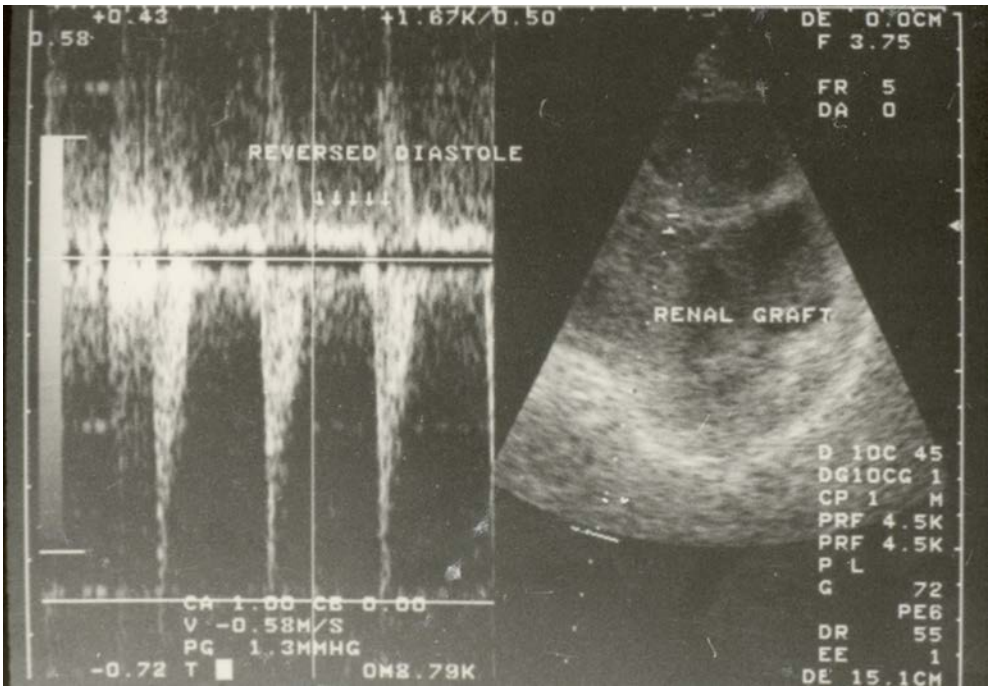

Fig. (1), a: Duplex Doppler US: The diastolic flow is diminished and reversed under the base line at level of segmental artery.

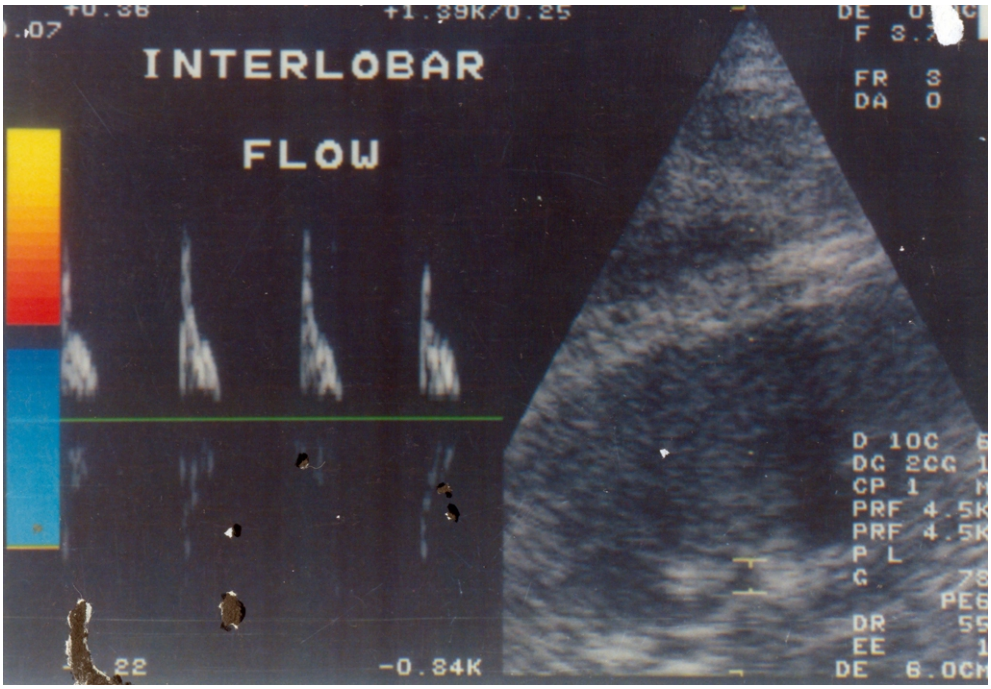

Fig. (1), b: Duplex Doppler US: Marked obilteration of diastolic flow at the level of interlobar artery.

Case No. 2:(fig 2 a&b)

A male patient 39years old ,transplanted on 20/3/2006,diuresis started to decline and creatinine level increased reaching up 5.1 mg/dl.

U.S.:

On 21/9/2006 US was done,revealed enlargement of the graft,with prominence of renal pyramids and indistinctiness of cortico-medullary boundary,picture consistent with acute rejection.

Duplex Doppler:

Doppler examination,showed diminished diastolic flow at different internal vascular sites,together with elevated R.I.(2.60 at arcuate artery).

Scientigraphy:

Scientigraphy was done on 23/9/2006 revealed decreased perfusion.

U.S. guided biopsy:

U.S. guided biobsy,performed on 25/9/2006,revealed picture of acute vascular rejection.

Angiography:

Angiography,was done on 27/9/2006,showed marked attenuation ,beading and irregularity of internal arteries.

Treatment:

Nephrectomy was done on 13/10/2006after no response to immunosuppressive therapy.

Final diagnosis:

Acute vascular rejection.

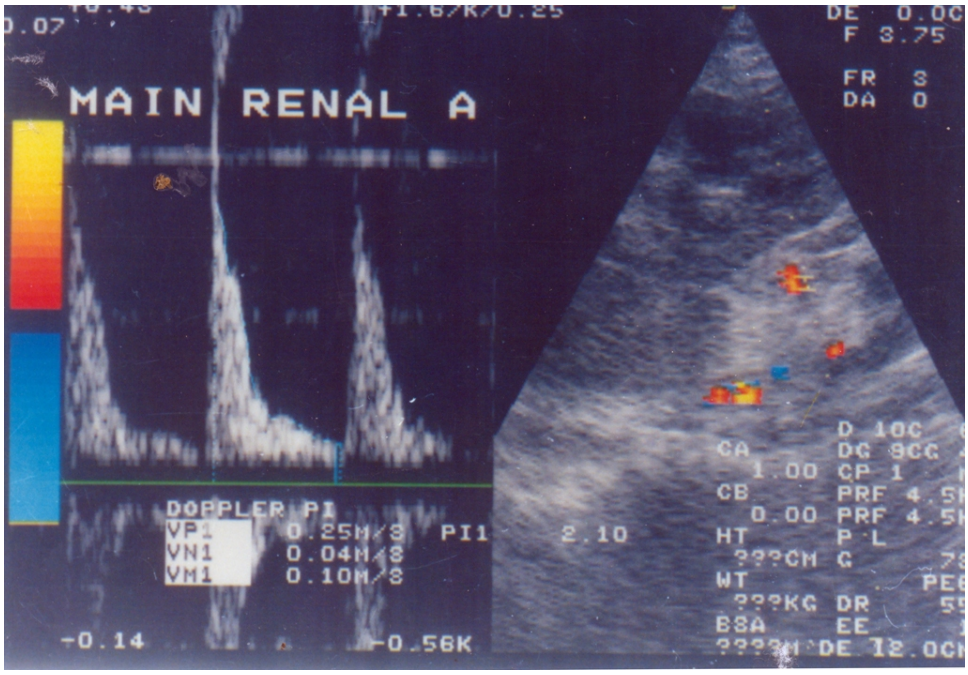

Fig. (2), a: Duplex Doppler US:
Diastolic flow is diminished with high P.I. (2.10) at level of main renal artery.

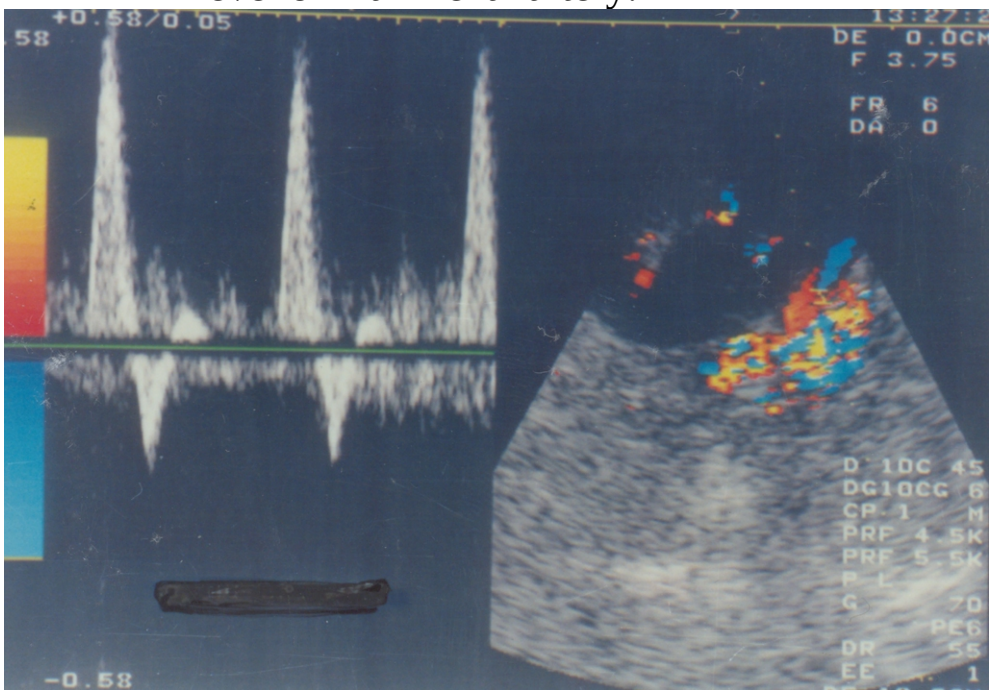

Fig. (2), b: Duplex Doppler US:
Diminshed diastolic flow with high P.I. (2.60) at the level of arcuate artery.

Case No.3 :(fig3 a)

A female patient 39 years old ,underwent renal transplantation 0n 2/3/2004 ,on 5/3/2004 she got diminished diurisis and marked rise of creatinine level (5.6 mg/dl).

U.S.:

U.S. examination revealed normal size and echogenicity of the graft with no manifestations of rejection,but it showed evidence of hydronephrotic changes with the level of obstruction at pelviureteric junction due to blood clot.

DuplexDoppler:

Doppler examination was done on 7/3/2004 and revealed normal signal shift and R.I. at different internal vascular sites.

Scientigraphy:

Scintigraphy was done on the next day ,showed major secretory insufficiency .

U.S. guided biopsy:

U.S. guided biopsy was done on 10/3/2004 and confirmed the case as acute tubular necrosis (ATN).

**In this case Doppler examination could not reach the diagnosis ,biopsy is the only confirmatory technique.

Final diagnosis :

Acute tubular necrosis.

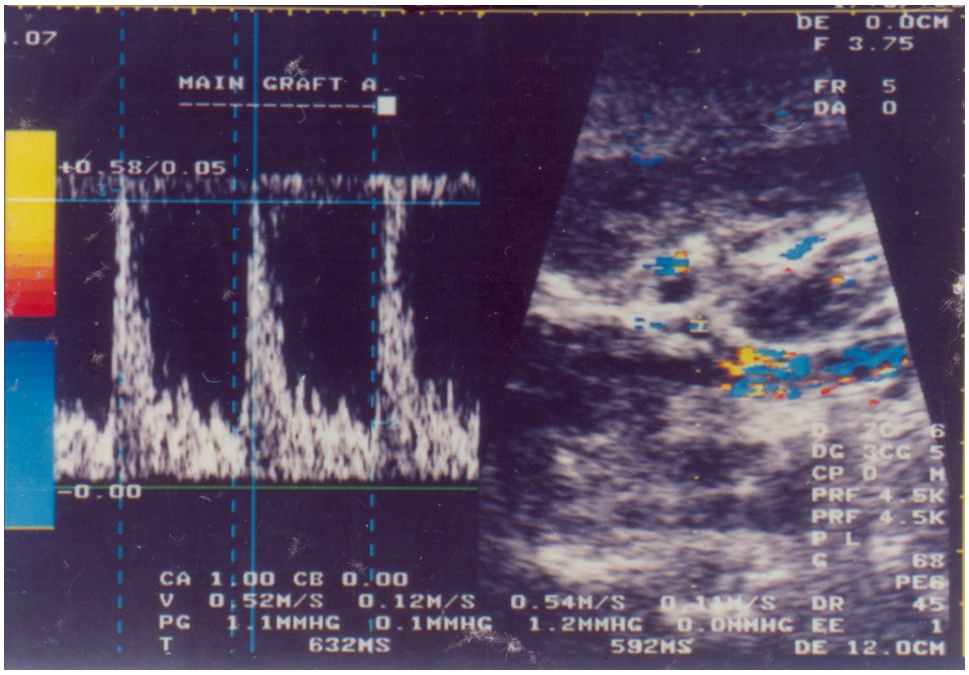

Fig. (3), a: Duplex Doppler US:
Normal signal shift at the level of main renal artery.

Case No.4 :(fig 4 a)

A male patient 18 years old,underwent transplantation on 8/6/2003. The operation was followed by anuria and gradual increase of the creatinine level ,reaching up to 6.9 mg/dl.

Duplex Doppler:

Duplex Doppler was done on 16/6/2003,revealed marked enlargement of the graft,with peaked systolic frequency shift and loss of sigmoidal characteristics on the descending side of the systolic wave and retrograde plateau like frequency shift during diastole.
R.I. was elevated,(about 1.95 at arcuate artery),venous Doppler signals could not be recorded neither within the hilum nor within the parenchyma.

Treatment:

Nephrectomy was done on 28/6/2003 revealed multiple thrombi inside dilated renal vein.

Final diagnosis :

Renal vein thrombosis.

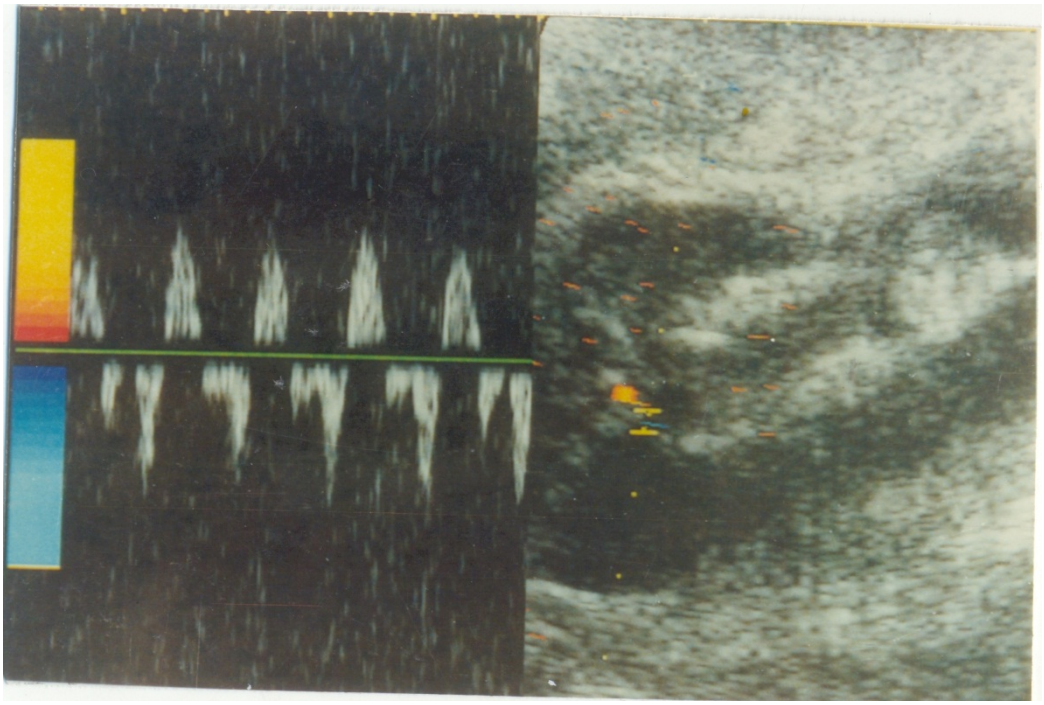

Fig. (4), a: Duplex Doppler US:
Peaked systolic frequency, loss of sigmoidal characteristics on descending side of systolic wave retrograde frequency during diastole.

Case No. 5 :(fig.5 a&b)

A female patient 45 years old,underwent renal transplantation 0n 25/10/2003,one week after surgery,she got fever,graft tenderness and rise of creatinine level (7.1 mg/dl)

Duplex Doppler:

On 5/11/2003 Doppler examination revealed diminished diastolic flow with high R.I

On 10/11/2003 Doppler study demonstrated total lack of arterial vascular signals throughout the graft with patent renal vein,only modulated venous signals were recorded.

Angiography:

Angiography was done on 11/11/2003,showed complete occlusion of renal artery one cm distal to the site of anastomosis.

**In this case Doppler examination was a diagnostic method in renal artery thrombosis,and angiography was done for confirmation.

Treatment:

Nephrectomy was done on 14/11/2003,revealed complete thrombosis of the renal artery with multiple areas of necrosis.

Final diagnosis :

Renal artery thrombosis.

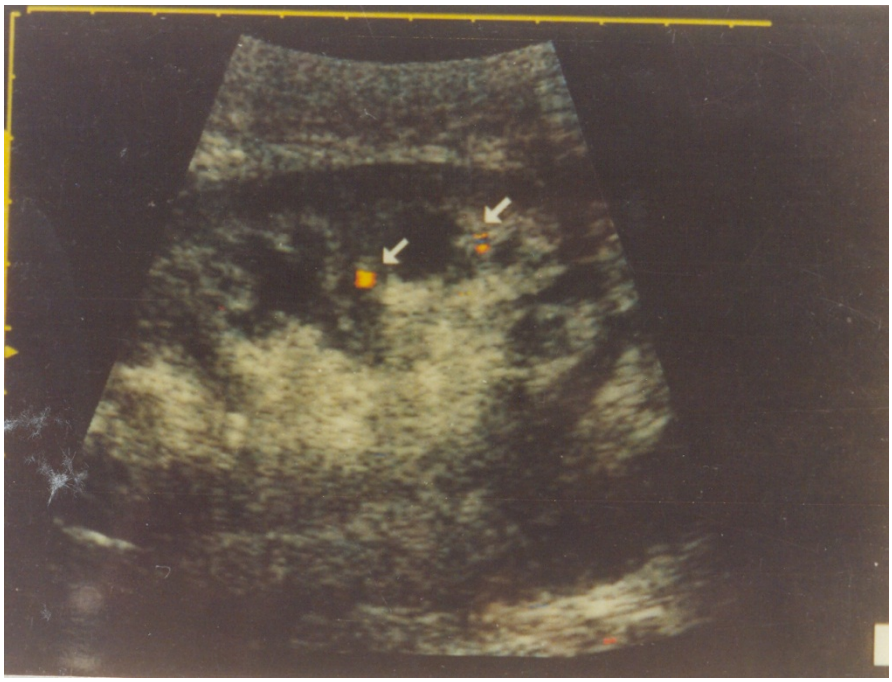

Fig. (5), a: Duplex Doppler US:
Coloured sonography of allograft revealing poor vasulature.

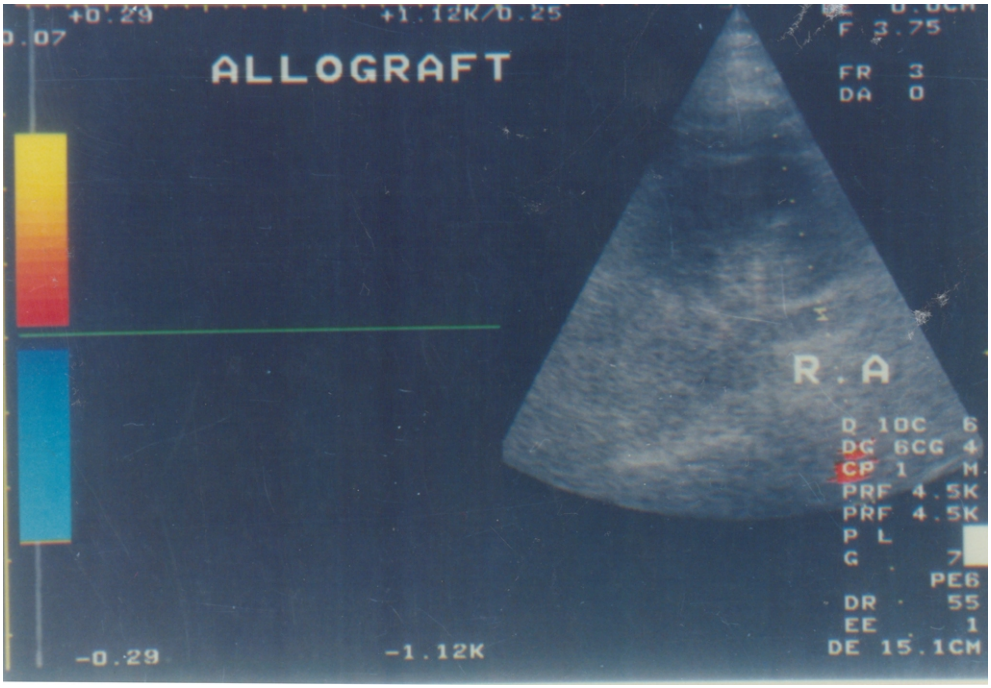

Fig. (5), b: Duplex Doppler US:
No signal shift detected while the cursor (sample volume) placed on renal artery.

Case No. 6 :(fig.6 a&b)

A female patient 41 years old,transplanted on 3/3/2007.
On 23/6/2007 the diuresis was reduced and creatinine level was high (3.7 mg/dl) and the patient got fever on 25/6/2007.

U.S.:

U.S. examination revealed moderate fluid collection about 7 cm below the upper pole of the graft which shows normal sonographic appearance .

Duplex Doppler:

Doppler examination showed diminished diastolic flow with high R.I.(1.47 at arcuate artery).

U.S. guided biopsy:

U.S. guided biopsy revealed picture of arcuate rejection .

**In this case Doppler examination revealed graft dysfunction and Real time U.S. showed accompanied perinephric fluid collection.

Final diagnosis :

Arcuate rejection and perinephric fluid collection.

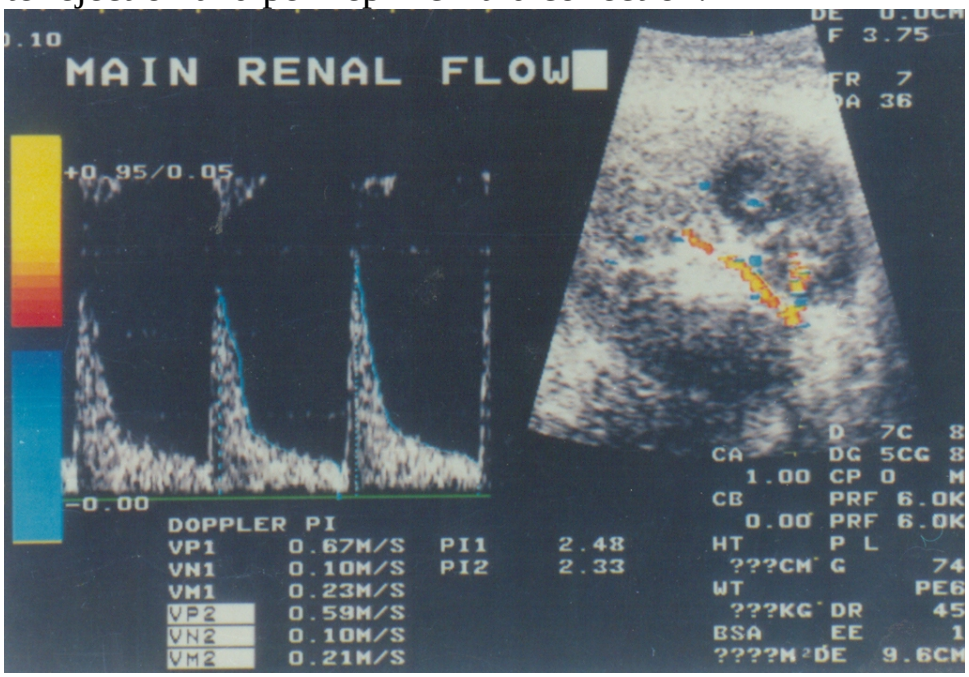

Fig. (6), a: Duplex Doppler US:

Diastolic flow is diminshed with high P.I. (2.48) at level of main renal artery.

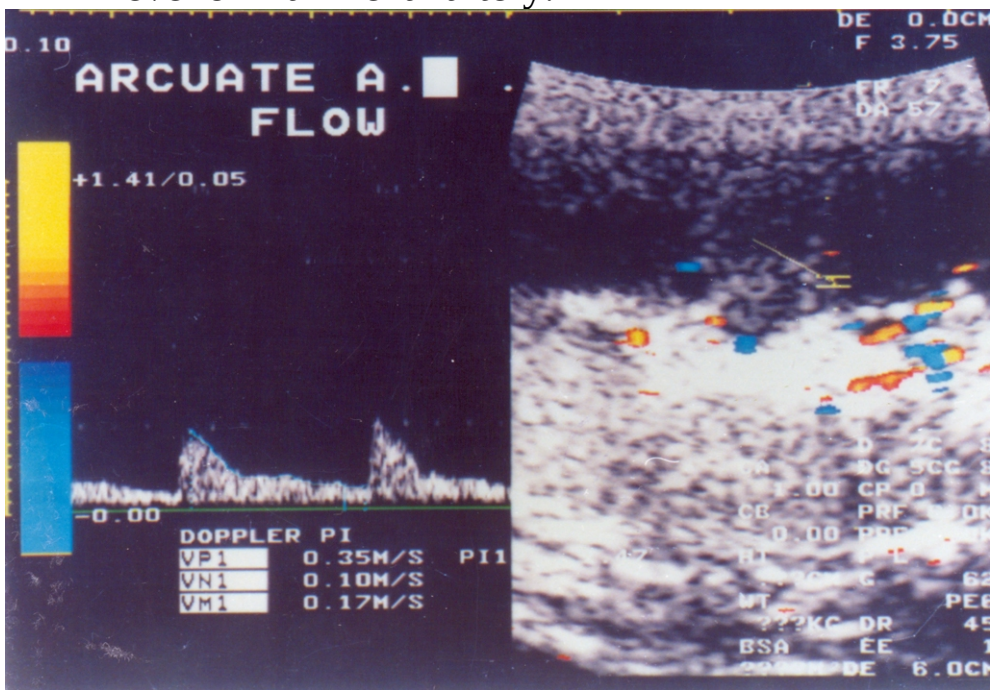

Fig. (6), b: Duplex Doppler US:
Diminshed diastolic flow with high P.I. (1.47) at the level of arcuate artery.