RENAL TRANSPLANT PATIENTS WITH HIGH-FLOW AVF: WHEN & HOW TO INTERVENE

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FACULTY DISCLOSURE

• Funded Research – Takeda, Griffols.
EDUCATIONAL NEED/PRACTICE GAP

Gap = Current practice is based upon referral pattern of nephrologists and desire on the patients part to be rid of the “ugly” access on their arms. Optimal practice is dictated by clinical relevance of maintaining the access for the future.

Need = Patients/ Clinicians are faced with the dilemma of functioning renal allografts and functioning angioaccess which are not being used.
Upon completion of this educational activity, you will be able to:

- Discuss the growth in demand for renal transplants and lack of growth of supply of organs.
- Elaborate on the decrease in graft and patient survival rates following renal transplants.
- Discuss, when and if to intervene in Renal Transplant recipients who present to use your office seeking removal or ligation of the AVF.
EXPECTED OUTCOME

• To know what are the indications to tie off an AVF.
As of March 18, 2016 the number of patients awaiting kidney transplants according to UNOS was 100,467 for kidney only and 1,932 for kidney and pancreas.

In February, 2011 the number of people awaiting transplants for kidney (only) was 87,820.

UNOS database in 2011:
- 5,772 living donor kidney transplants
- 11,043 deceased donor transplants

In 2016, the number has changed minimally:
- 5,629 living donor transplants
- 12,250 deceased donor transplants

An increase of less than 1100 renal transplants
RENAL TRANSPLANT PATIENT SURVIVAL RATES

- 1-year patient survival rate for living donor transplants is 95.1%.
- 1-year patient survival rate for deceased donor transplants is 89.0%.
RENAL TRANSPLANT
GRAFT SURVIVAL RATES - DECEASED DONOR

Probability of transplanted kidney surviving from day 1 of transplantation:
1 year (2007–2008): 90.8
2 years (2006–2008): 85.2
5 years (2003–2008): 69.1
10 years (1998–2008): 44.6
RENAL TRANSPLANT
GRAFT SURVIVAL RATES- LIVING DONOR

Probability of transplanted kidney surviving from day 1 of transplantation

1 year (2007–2008): 96.4
2 years (2006–2008): 93.4
5 years (2003–2008): 81.0
10 years (1998–2008): 59.1
WHAT CHOICES DO WE HAVE?

• TOTALLY LIGATE THE FISTULA

• REDUCE FLOW BY BANDING
COMPlications that may necessitate AVF ligation

- Infection - rarely
- High output failure
- Distal ischemia
- Pseudoaneurysm formation with risk of rupture
- Venous hypertension with swollen arm
- Angiosarcoma - 4 cases in literature
- ‘Cosmetic’ - Rarely should one ligate because the patient states the AVF is ‘ugly’
HEART FAILURE (HF)

- AV fistula can lead to increased cardiac output (10-20%) as a result of decrease systemic peripheral resistance, LV dysfunction, elevation of atrial natriuretic protein. Studies have shown no significant effect on development of pulmonary hypertension.

- High flow AV fistula (>2 L/min) may cause heart failure - relationship between flow (Qa) of AVF and CO is complex and a third order polynomial regression model best fits and predicts relationship (Basile et al 2008). However a large US study found no significant association with the incidence of HF (Abbott et al 2003).

- Minimal impact on cardiac morphology and function in transplant patients following AV fistula ligation. Kidney transplantation does not reduce LVH.

- Report of fatal heart failure in transplant patient after ligation of high flow AV fistula (acute increase in peripheral resistance)
BENEFITS OF FUNCTIONING AVF

• Effect on BP - adds a low resistance, high compliance system resulting in lower peripheral resistance and decrease in BP

• Reduce arterial stiffness and increase in LV Ejection Fraction.

• Recently shown to be associated with reduction in the rate of decline of GFR in patients with advanced CKD.
EFFECTS OF AVF CLOSURE

- Effect on AVF closure on the AVF induced structural changes- hotly debated. Multiple case reports have described reduction of signs of HF following closure.
- The effects of AVF closure in asymptomatic patients are less clear.
- Recent study from UK showed occlusion of AVF led to reduced cardiac output and improved oxygen delivery- most marked in patients with high flow AVF (>2000 ml/min). However actual reductions in CO were fairly modest only.
- Functioning AVFs are well tolerated in most RT patients (Patard et al 2002)
- Brazilian study showed only LV end diastolic dimension was reduced with ligation of avf- All other parameters unchanged. (De Lima et al 1999).
- In essence MANY DOUBTS, FEW CERTAINTIES IN REGARDS TO THE EFFECTS OF AVF CLOSURE.
HPI: 72 y/o male renal transplant patient with severe pulmonary hypertension was referred for surgical evaluation of AVF, possible ligation of AVF. In the past on dialysis with left upper extremity AVF.

PMHx: ESRD secondary to GN and HTN, kidney transplant in 1986 then in 2011, mitral valve replacement. In 2006 diagnosed with severe mitral regurgitation and pulmonary hypertension.

Cardiac cath on 06/13/2011 showed severe dilation of RA, dilated RV, LVEF 63%.

Duplex scan of hemodialysis access on 02/13/2015 the outflow vein is patent with a mean volume flow of 2958 ml/min. There is a volume flow of 3759 ml/min at the distal upper arm.

Patient had AVF tied off under local anesthesia in the operating room.
CONCLUSION 1

1. Do not ligate the access in the first year post transplant unless it is an emergency.
2. Asymptomatic AVF should never be ligated
3. Complications including severe venous hypertension, risk of rupture from pseudo aneurysm, significant high output failure (>2L/min) or ischemic hand may necessitate AVF ligation.
4. Assess risk of graft failure and only consider ligating in patient with stable transplant function after consultation with nephrologist
5. Avoid ligation forearm AVF as they are associated with lower flows, less complications and fewer adverse sequelae.

FINALLY
CONCLUSION 2

If patient demands AVF ligation for cosmetic indications:

1. Tell the patient that you do not want to ligate the access
2. Repeat and tell the patient that you do not want to ligate the access
3. Check the creatinine
4. Speak to the transplant program and only if they give you the go ahead should you consider ligating the fistula.
WHEN SHOULD FUNCTIONING AV FISTULAS BE LIGATED AFTER RENAL TRANSPLANTATION ALMOST NEVER
WHY? ....... BECAUSE

The access is the lifeline of these patients and must be protected at all costs as many patients will return to dialysis.