Surgical salvage of complicated AV fistulae

By

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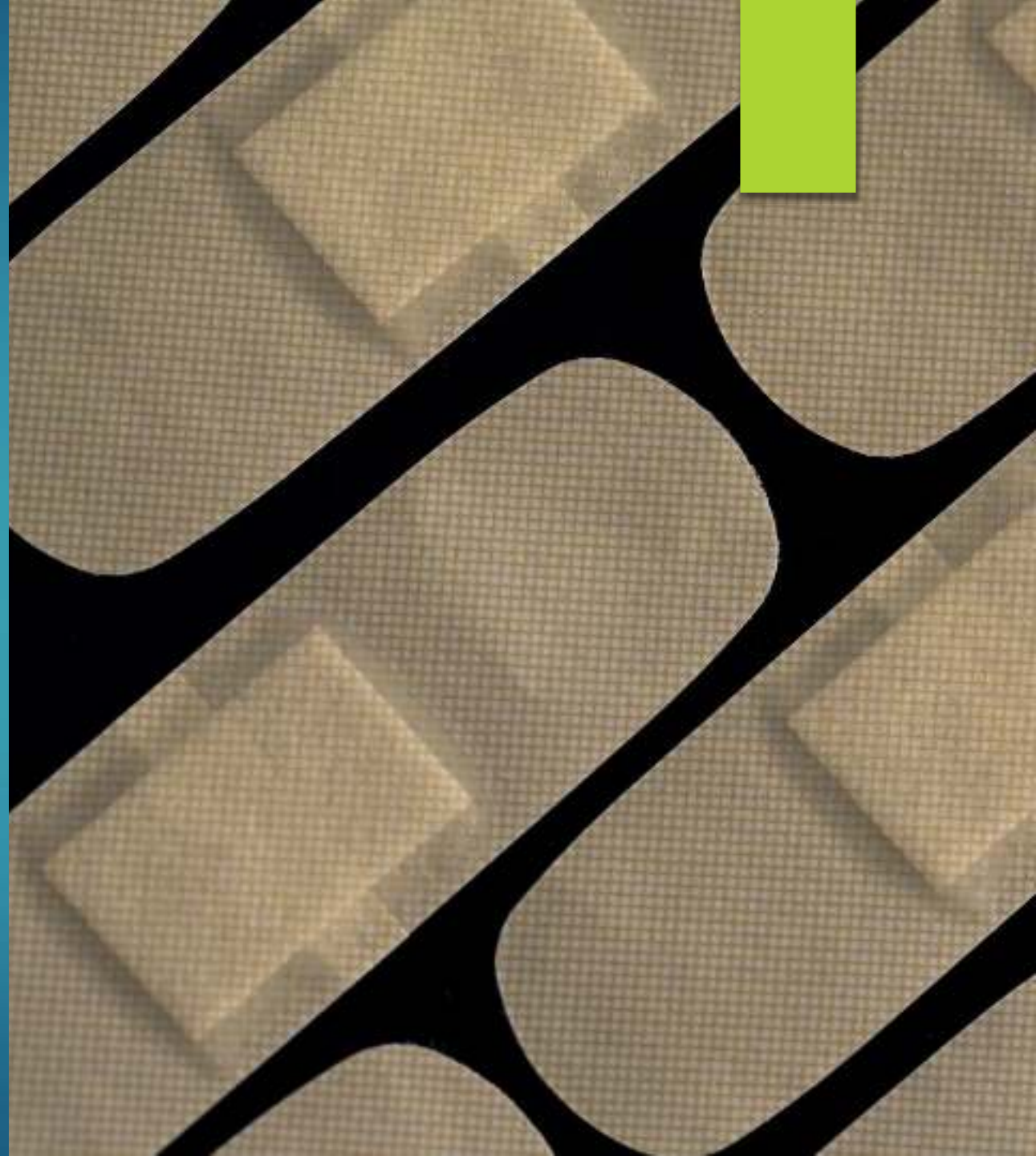
INTRODUCTION

End-stage renal disease (ESRD) is increasing worldwide. Renal replacement therapy (RRT) and kidney transplantation are increasing the burden on health systems.

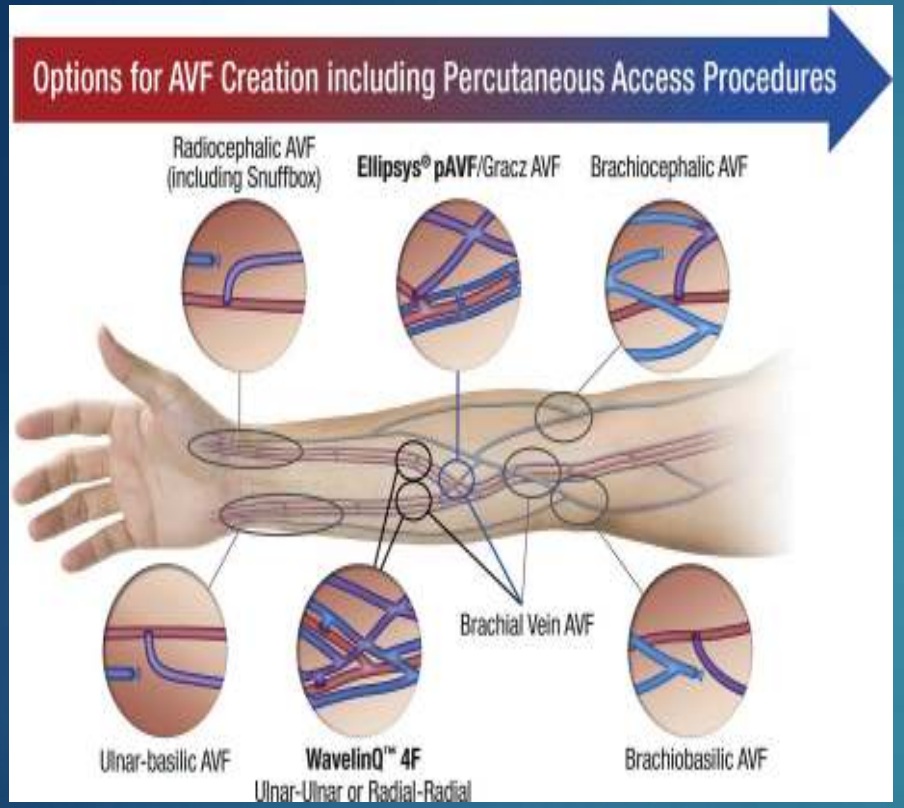
According to 9th Annual Report of The Egyptian Renal Registry provided by Egyptian Society of Nephrology and Transplantation (ESNT), prevalence of ESRD in Egypt raised to 483 patients per million.

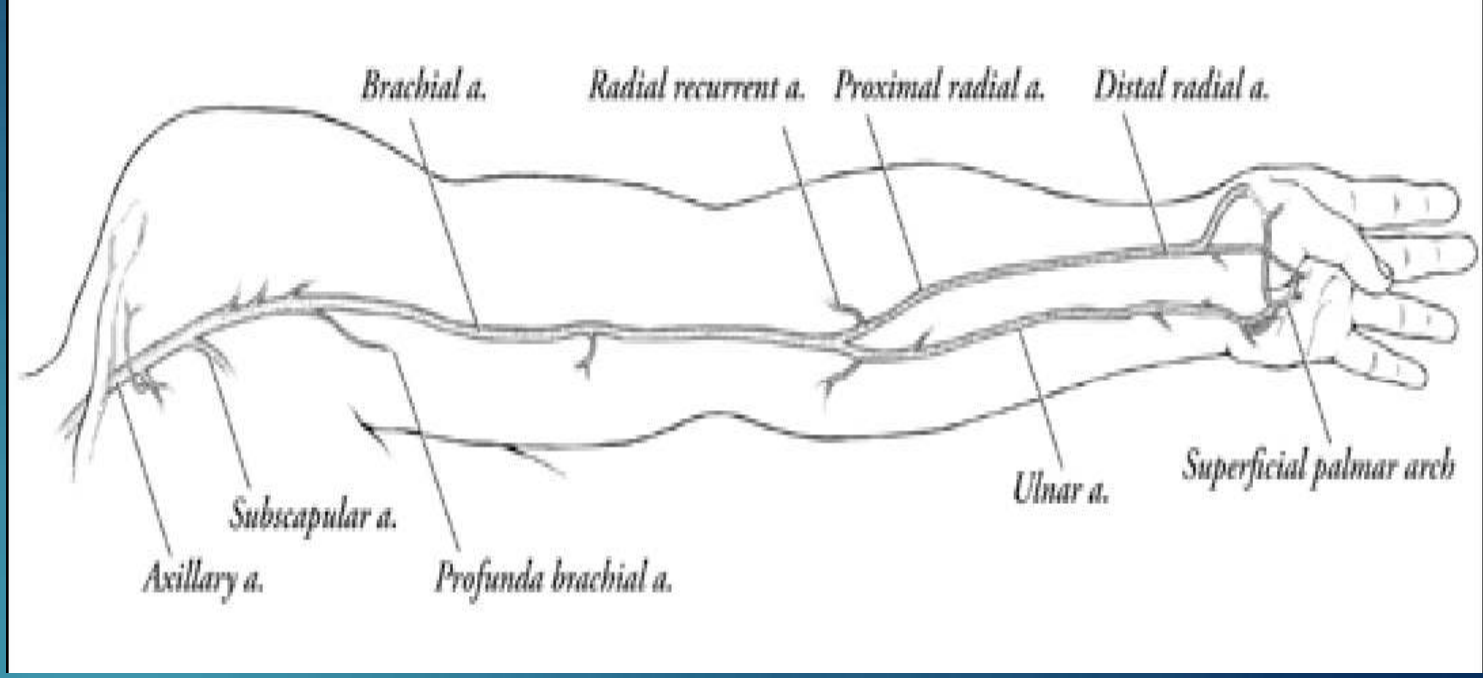
- Hemodialysis fistulae are surgically created communications between the native artery and vein in an extremity.

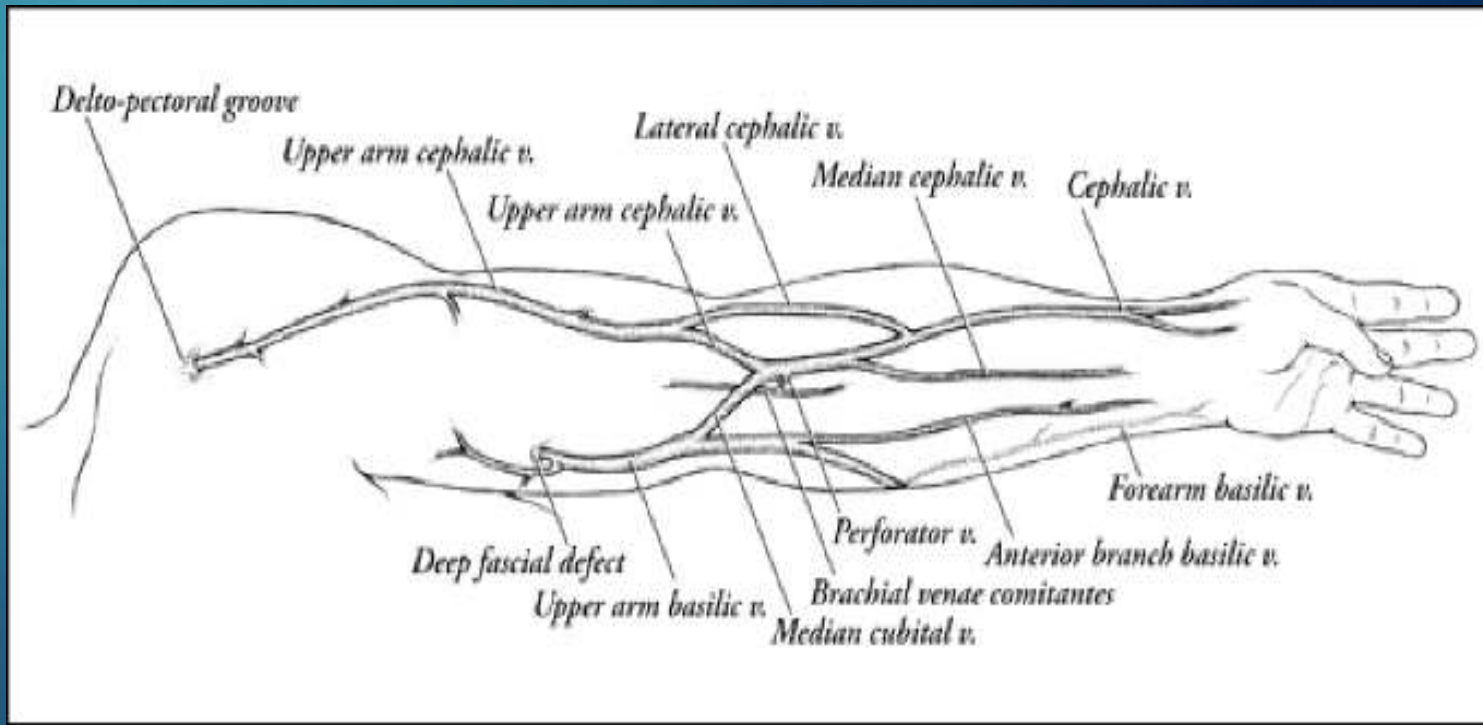
- There are a lot of short and long□term complications that may interfere with the function of the dialysis.



- Arteriovenous fistula salvage surgery is of paramount importance in order to increase the patency rate, which prolongs survival and increases the patient’s quality of life.


Options for AVF Creation including Percutaneous Access Procedures
Radiocephalic AVF
(including Snuffbox)
Ellipsys® pAVF/Gracz AVF
Brachiocephalic AVF
Brachial Vein AVF
Ulnar-basilic AVF
WavelinQ™ 4F
Ulnar-Ulnar or Radial-Radial
Brachiobasilic AVF


Brachial a.
Radial recurrent a.
Proximal radial a.
Distal radial a.
Subscapular a.
Axillary a.
Profunda brachial a.
Ulnar a.
Superficial palmar arch


Delto-pectoral groove
Upper arm cephalic v.
Lateral cephalic v.
Median cephalic v.
Cephalic v.
Upper arm cephalic v.
Forearm basilic v.
Perforator v.
Anterior branch basilic v.
Deep fascial defect
Brachial venae comitantes
Upper arm basilic v.
Median cubital v.

AVF Complications

- **Complications include:**

(1) Aneurysmal Enlargement of Blood Vessel Walls.

(2) Vascular Access-Induced Ischemia (ARTERIAL STEAL SYNDROME).

(3) Venous hypertension (V-HTN).

(4) Arteriovenous Access Thrombosis.

(5) Arteriovenous Access Stenosis.

(6) Infections.

(7) High-output cardiac failure.

AVF complications can be diagnosed through:

Physical examination :	Reduced thrill or pulsation.	Water hummer pulse.	Signs of high output cardiac failure.
Pallor, coldness, abnormal motor or sensory function, ↓ or absent radial pulse up to digital ulceration or gangrene in case of HAIDI.	Signs of infections : erythema or pus discharge in case of infection.	Limb edema, pigmentation, thickening and extensive collaterals in case of V-HTN.	**Investigations :**
Duplex u\s :	Ying yang sign	**CT venography** .	

MANAGEMENT OF COMPLICATIONS OF AVF :

surgery

Endovascular intervention

Aim of the Work

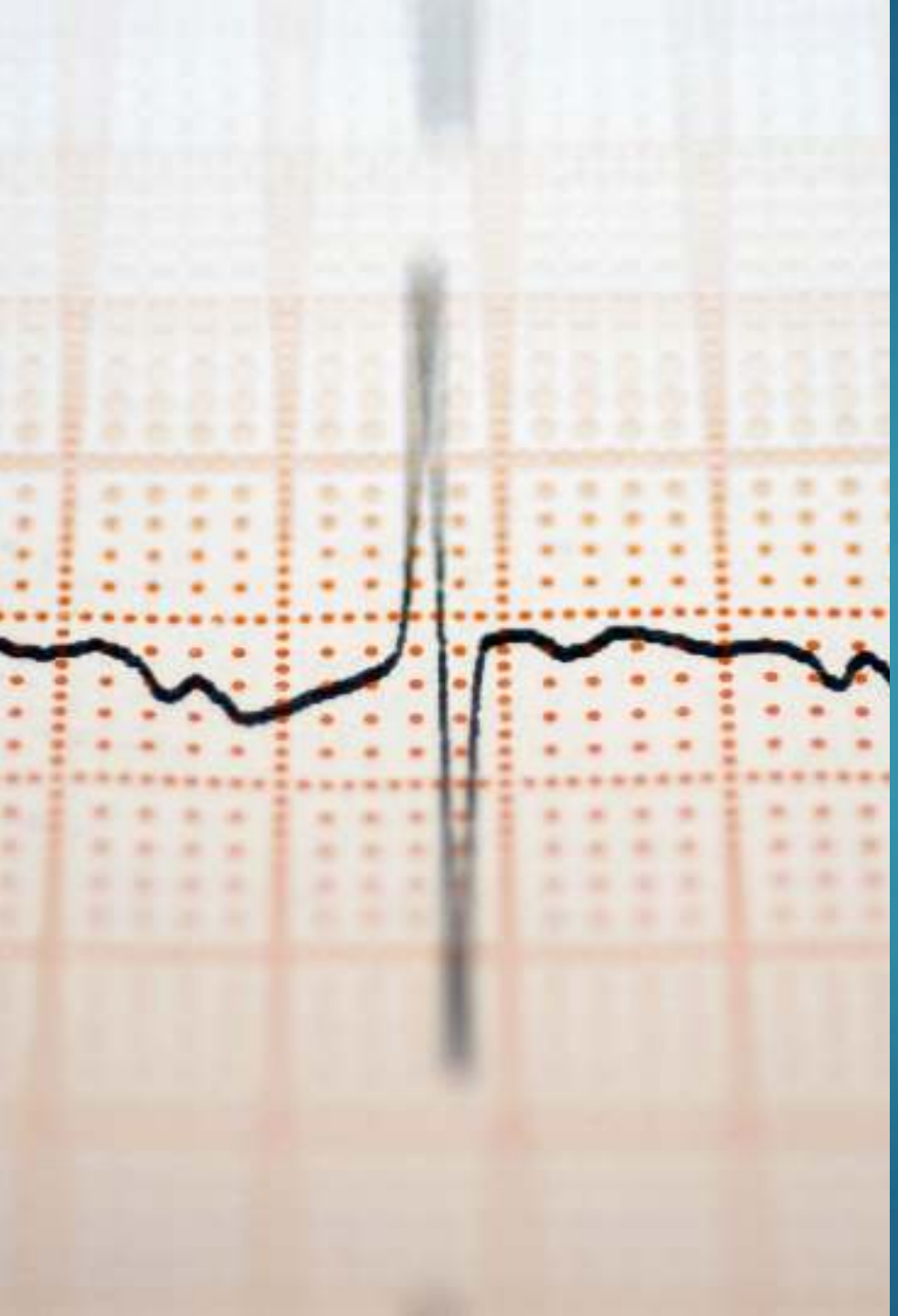
- To evaluate the surgical solutions of complicated autogenous arterio-venous access in dialysed patients with end stage renal disease (ESRD).

Patients and Methods

our study was a prospective, quasi-experimental blinded study conducted in the department of vascular surgery at Al_Zahraa university hospital from January 2022 to June 2023.

This study conducted on 50 ESRD patients presented with complicated autogenous arteriovenous access .

Follow up period : 18 months.



Inclusion criteria:

- ESRD patients with autogenous upper limb AVF (proximal or distal).
- ESRD patients without heart failure.

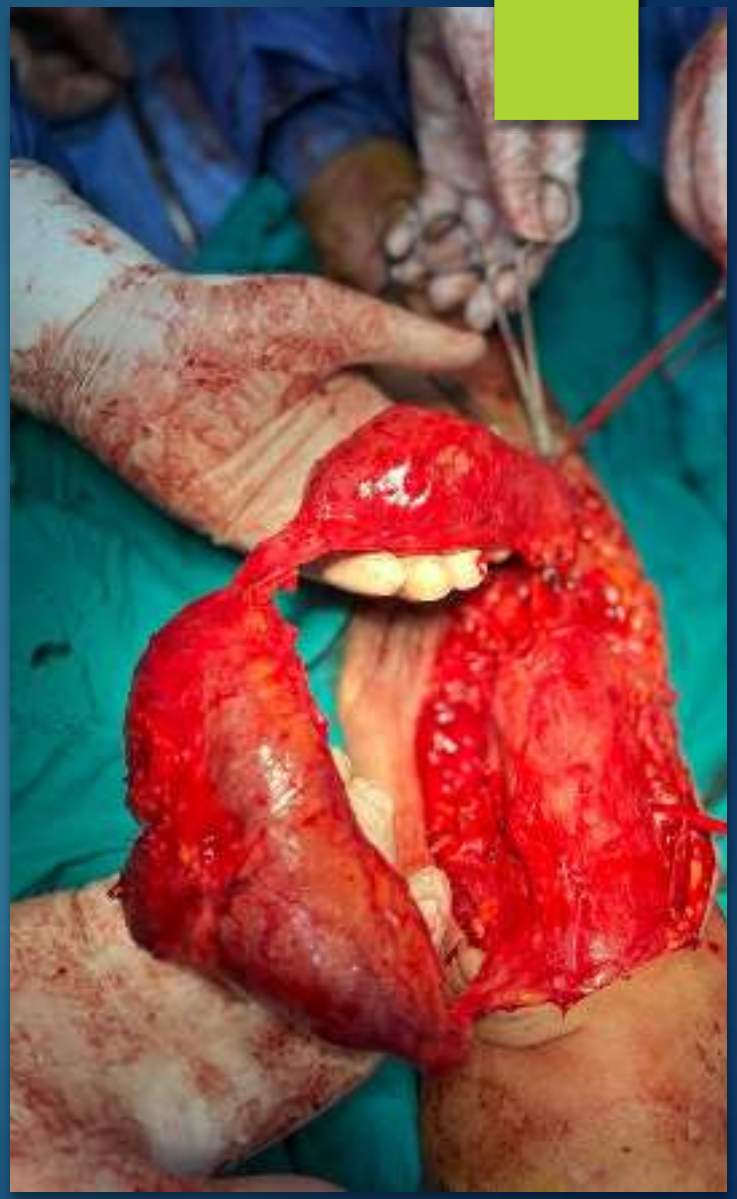
Exclusion criteria:

ESRD patients with synthetic graft, extraanatomical graft, HeRO graft and lower limb fistulae.

ESRD patients with heart failure.

Procedures:

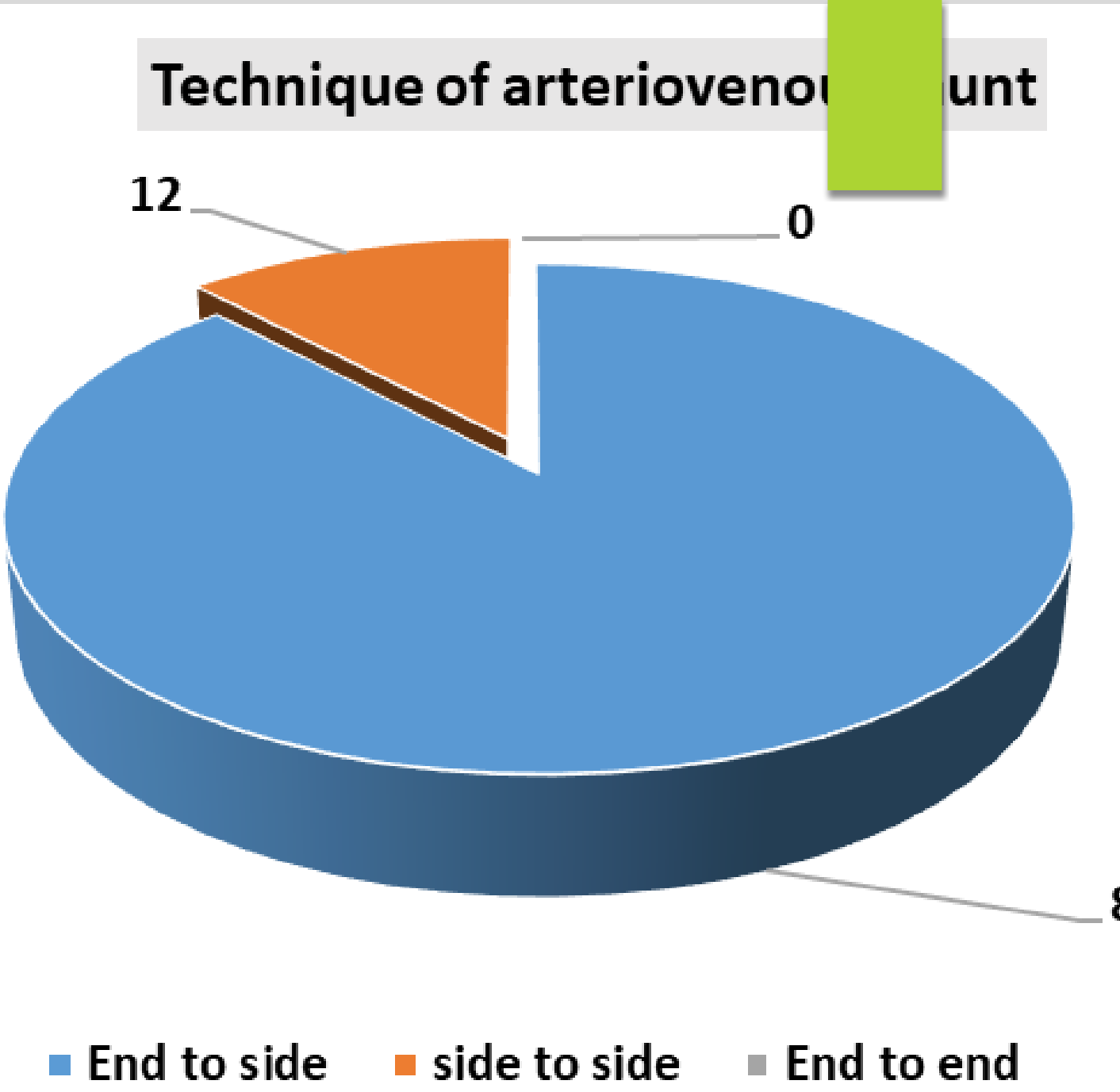
According to each complication:	**True or Pseudoaneurysm:** Aneurysmorrhaphy or aneurysmectomy with end to end anastomosis.
	Thrombosis: thrombecomy.
	Stenosis: Excision of stenosed segment with end to end anastomosis.
	Vascular steal syndrome:
	Restriction of flow (banding or tapered conduit).
	Rerouting of arterial inflow [distal revascularization and interval ligation (DRIL), revision using distal inflow (RUDI) and proximalization of arterial inflow (PAI)].
	Ligation or deconstruction of the access.
	Venous hypertension: Ligation of the patent distal vein branch.
	Infection: Debridement or fistula sacrificing.
	Bleeding fistula: Control of bleeding.
	Twisted basilic vein: Untwisting + reanastomosis.

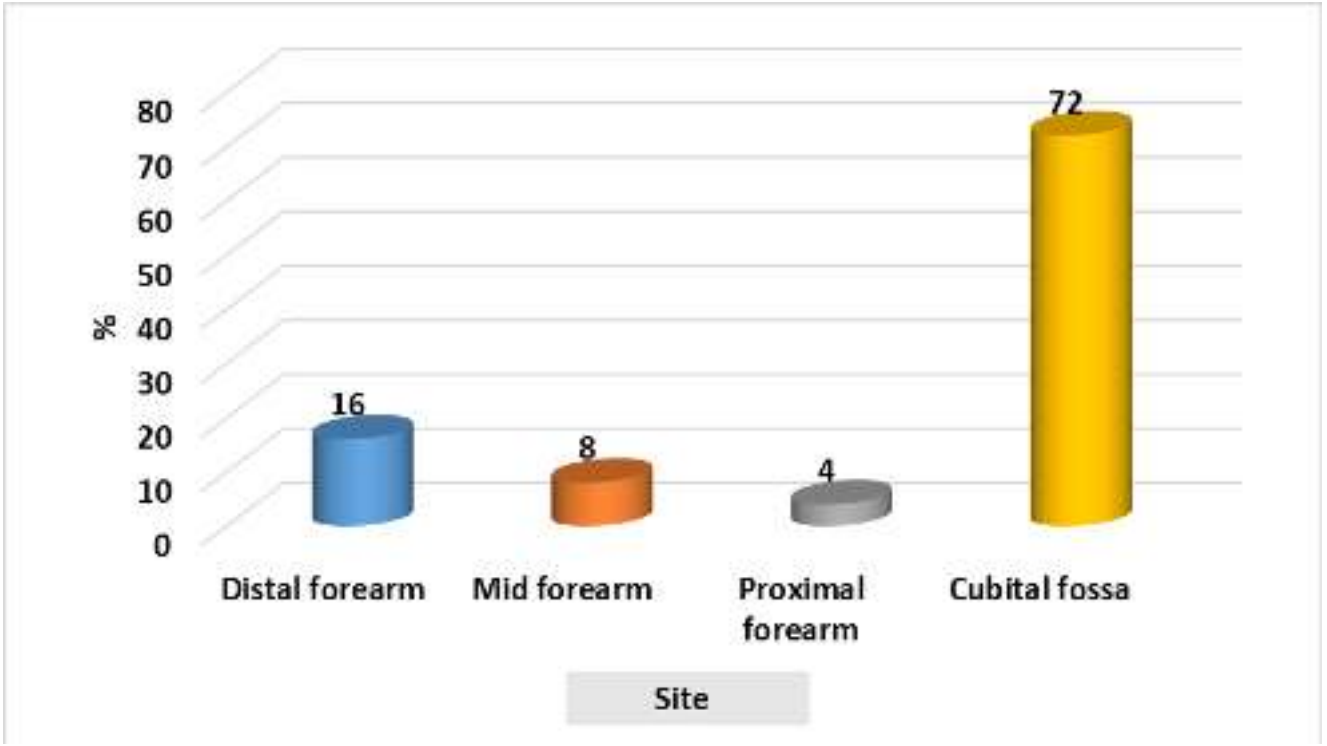


Sociodemographic characteristics of the studied cases:

	n=25	%
Age/years Mean ± SD (min-max)	49.16±8.09(33-62)	
Sex Male Female	 17 8	 68.0 32.0
Hypertension	15	60.0
DM	11	44.0
Atherosclerosis	16	64.0
Smokers	11	44.0

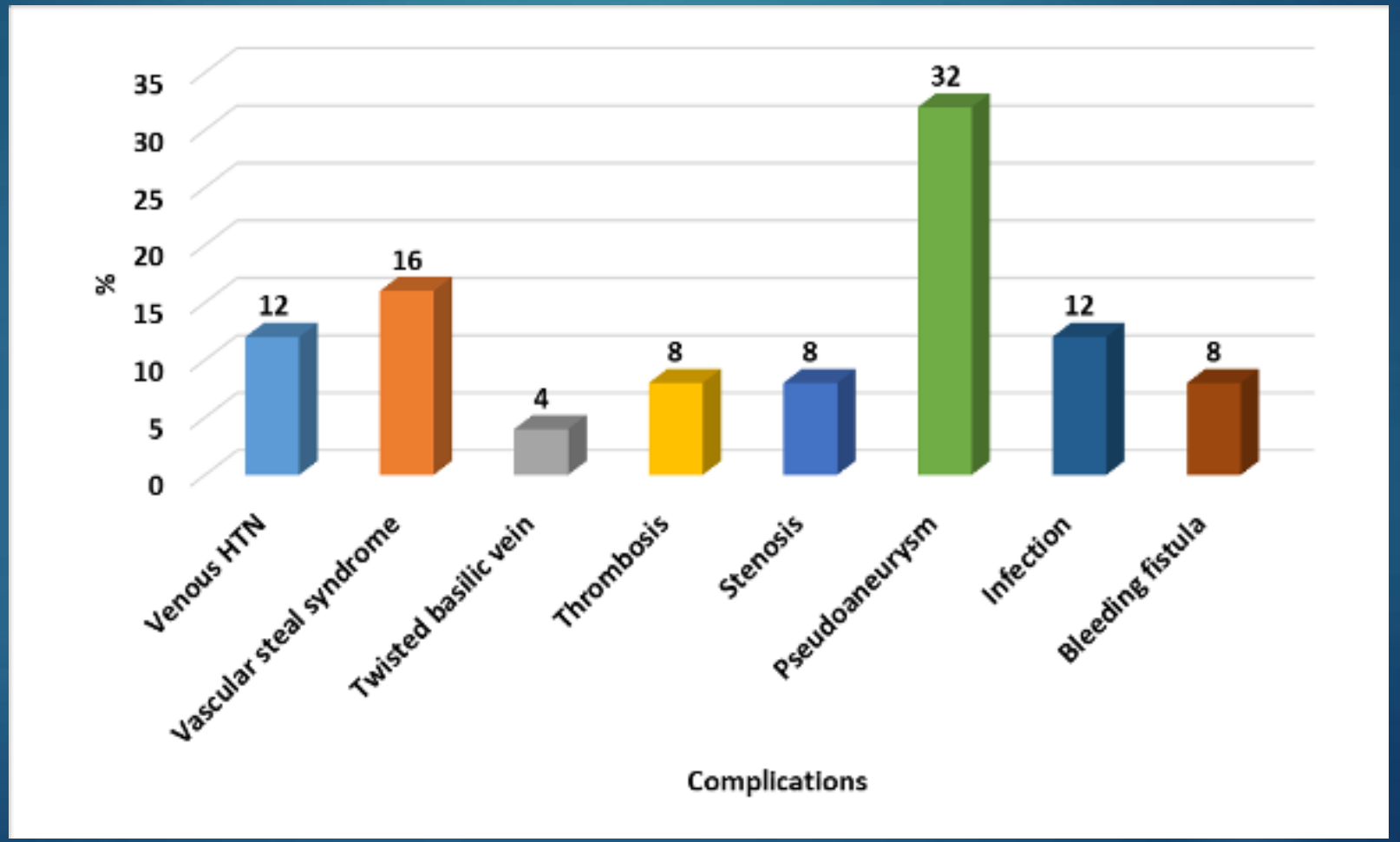
Distribution of the studied cases according to technique of AVF:





Distribution of the studied cases according to site of AVF:

Distribution of the studied cases according to complications:



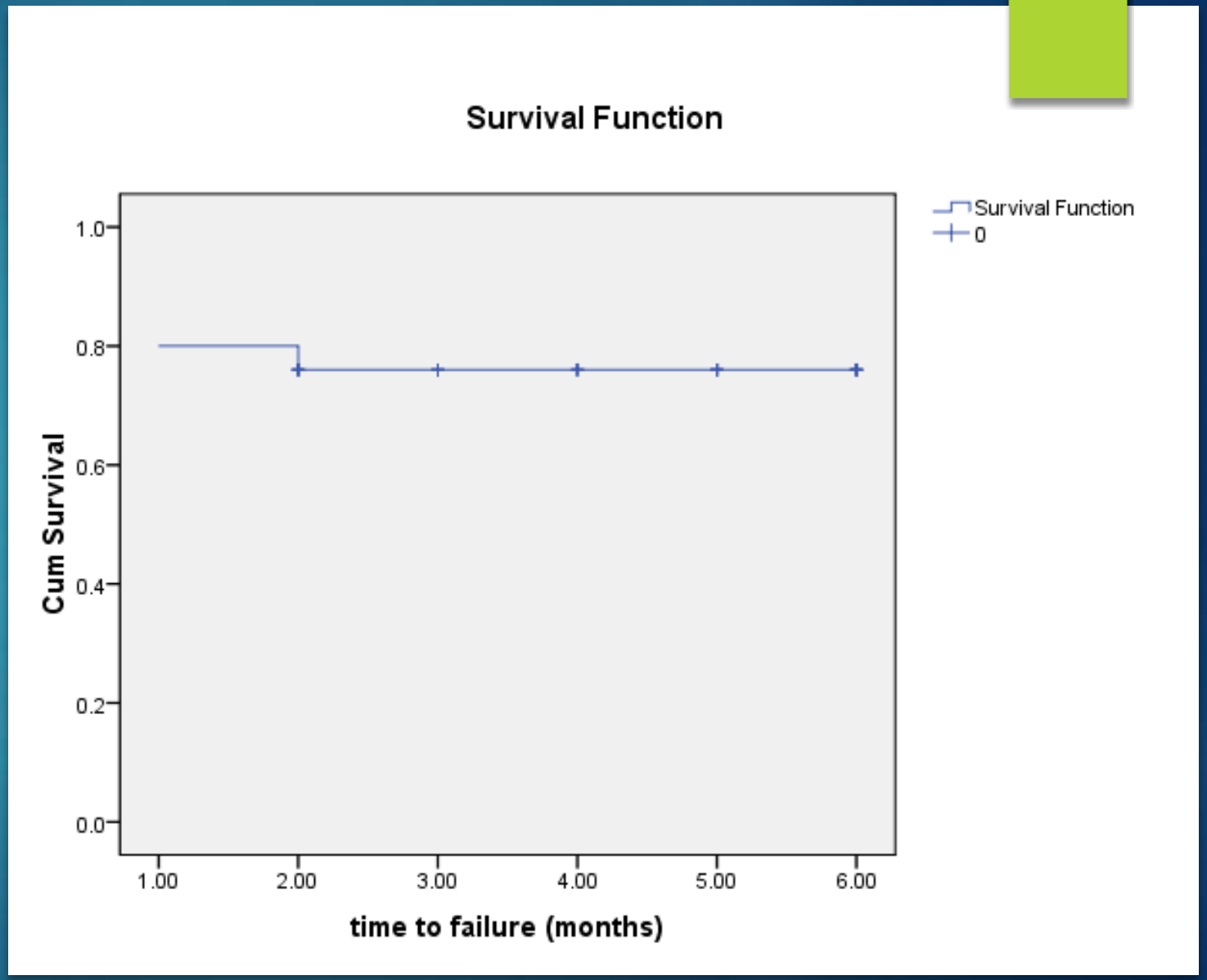
Distribution of the studied cases according to management of complications and their success rate:

Complications	Management	Failure N (%)	Success N (%)	test of significance
Venous HTN (n=3)	Distal ligation	0	3(100)	p=1.0
Vascular steal syndrome(n=4)	Wrapping Fistula sacrificing DRIL	0 1(100) 0	2(66.7) 0 1(33.3)	p=0.135
Twisted basilic vein (n=1)	Untwising + re-anastomosis	0	1(100)	p=1.0
Thrombosis n=2)	Thrombectomy	1(50)	1(50)	p=1.0
Stenosis (n=2)	Excision with end to end anastomosis	0	2(100)	p=1.0
True or Pseudoaneurysm (n-=8)	Aneurysmorrhaphy Aneurysmectomy with fistula closure Aneurysmectomy with end to end anastomosis	1 1(50) 0	2(33.3) 0 4(66.7)	p=0.108
Infection(n=3)	Fistula sacrificing Debridement	2(100) 0	0 1(100)	p=0.083
Bleeding fistula(=2)	Control of bleeding	0	2(100)	p=1.0

Our Success rate was 76%

Relation between site of the AVF and its failure among dialysis patients:

Site	Failure N=6(%)	Success N=19(%)	test of significance
Distal forearm	1(16.7)	3(15.8)	FET=0.003 P=1.0
Mid forearm	1(16.7)	1(15.8)	FET=0.806 P=0.369
Proximal forearm	0	1(5.3)	FET=0.329 P=1.0
Cubital fossa	4(66.7)	14(73.7)	FET=0.111 P=1.0
difference between different sites	p=0.112	*p=<0.001	


Survival Function
Survival Function
0
Cum Survival
1.0
0.8
0.6
0.4
0.2
0.0
1.00
2.00
3.00
4.00
5.00
6.00
time to failure (months)

SUMMARY AND CONCLUSIONS

Name of presentation

Company name

Pseudoaneurysm was the most common complication encountered in our study (32.0%).

vascular steal syndrome encountered as second AVF complications in our study.

Correction of the steal syndrome is to aim at the double goal of preserving the access while improving peripheral arterial circulation.

The rate of infection was 6 out of 50 cases (12.0%). we tried not to lose the fistula but our success rate was (33.3%) 1 out of 3 cases.

Thrombosis is a common early and late complication that can lead to fistula loss.

Preoperative assessment with duplex u/s enhances the success of AVF creation and outcomes.

Postoperative u/s follow up and clinical examination can detect early complications allowing for prevention or early intervention.

Recommendations:

- Current study is a single center study, we recommend increasing sample size to gain more accurate results.
- Performance of multidisciplinary team including nephrologists, radiologists and vascular surgeons to assess AVF aiming to decrease complications rate.
- Regular surveillance, physical examination and clinical monitoring of the AVF should be done to identify early access dysfunction and correct it prior to access thrombosis or loss.

THANK YOU