

Non-maturing fistulas

The role of ultrasound

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Definition of a non-maturing fistula

A fistula that cannot be cannulated repeatedly with 2 needles and deliver a dialysis blood flow ≥ 300 ml/min within 6 months of its creation.

Of course, the evaluation should start 4-6 weeks after surgery!



Features of an ideal fistula

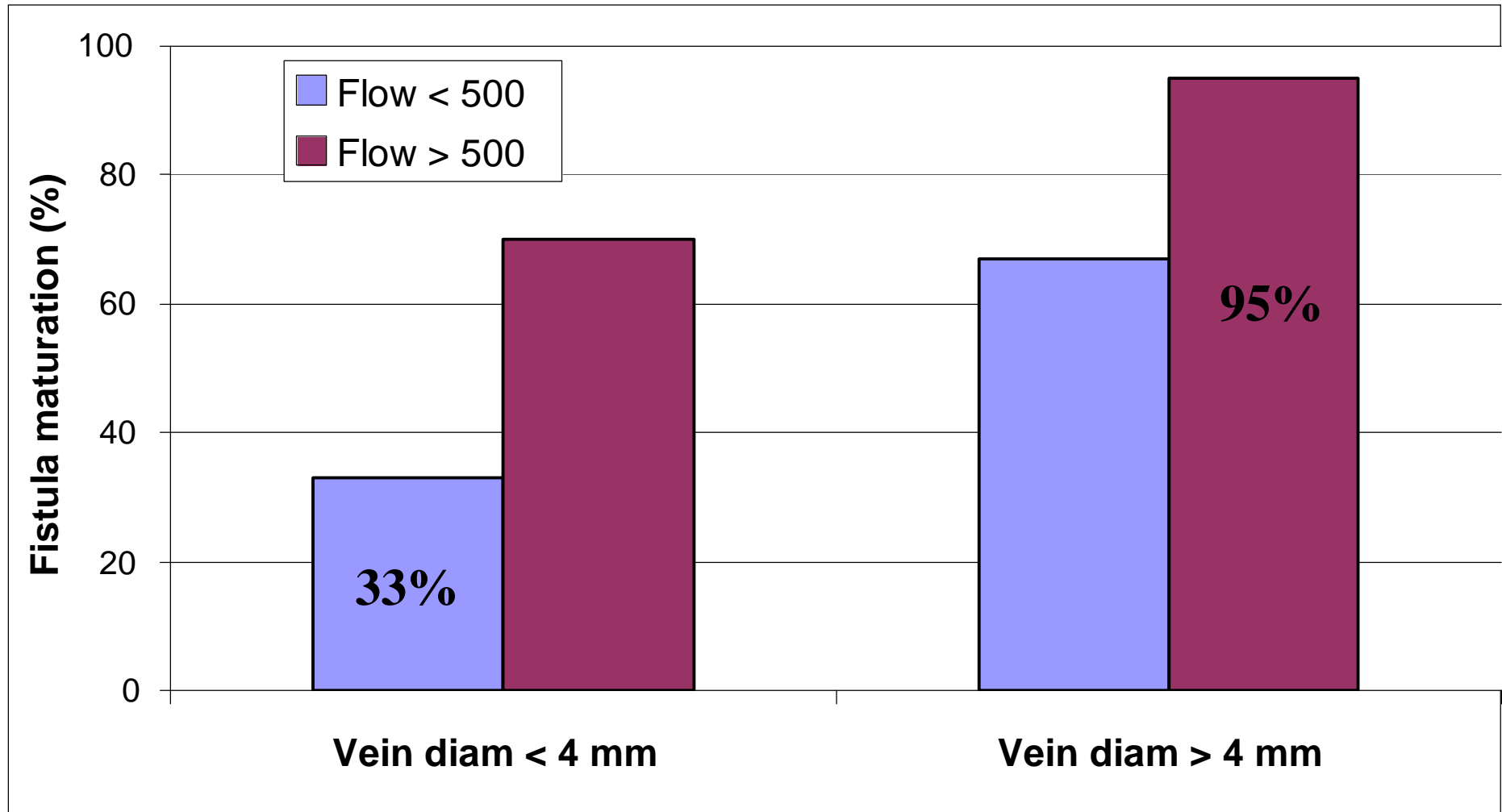
1. Large diameter
2. High access blood flow
3. Superficial
4. Adequate useable length for cannulation with two needles (>10 cm)

Can postoperative ultrasound predict fistula maturation?

Post-operative ultrasound assessment of new fistulas

- Ultrasound of fistula obtained 4 to 12 weeks after surgery.
- Vein diameter ≥ 4 mm and access blood flow ≥ 500 ml/min predict fistula maturation for dialysis.
- Ultrasound also reveals stenotic lesions, large accessory veins, and depth of fistula. These findings may result in interventions to salvage an immature fistula.

Postop US predicts fistula maturation



Robbin et al, Radiology, 2002

Postop US for management of fistulas

Criteria for mature fistula

- Diameter ≥ 4 mm
- Blood flow ≥ 500 ml/min
- Depth ≤ 5 mm

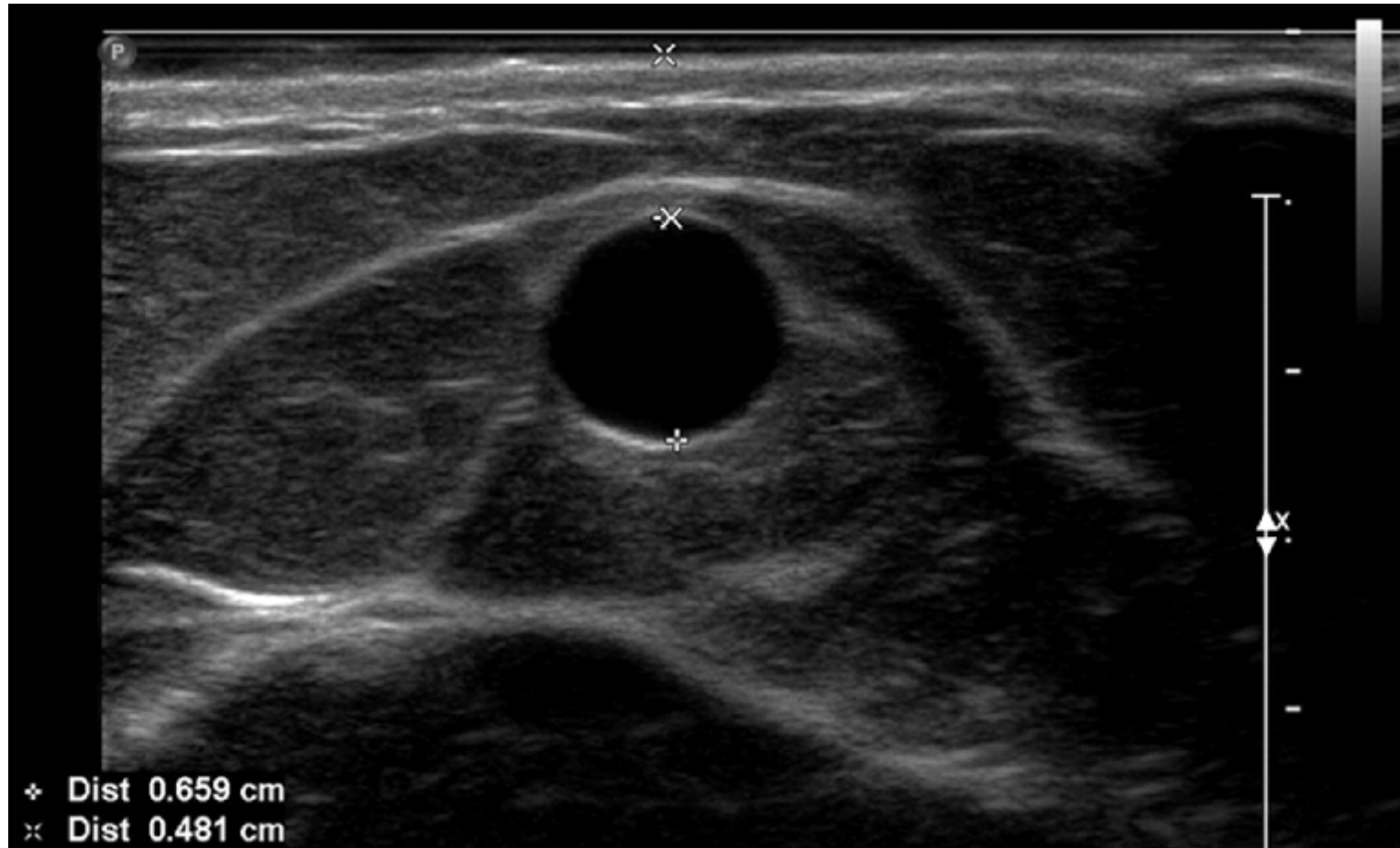
Salvage of immature fistulas

Problem

Solution

- Stenosis at anastomosis or draining vein → Angioplasty or surgical revision
- Large accessory veins → Ligation of veins
- Deep vein → Superficialization

Figure 1: Normal diameter fistula



Singh et al, Radiology, 2008

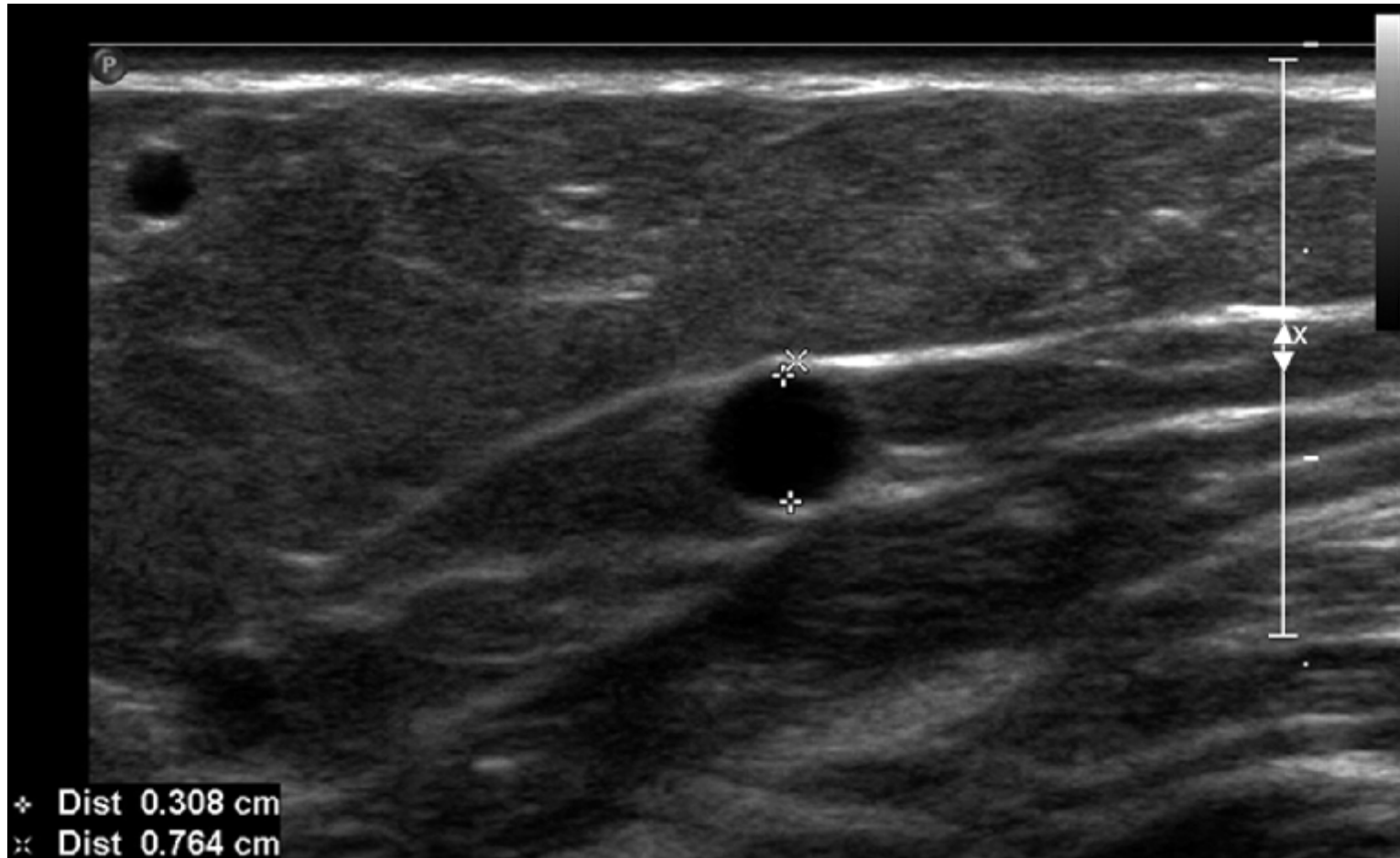
Vein diameter: 6.6 mm
Vein depth: 4.8 mm

Figure 2: Accessory vein



Singh et al, Radiology, 2008

Figure 3: Immature fistula



Singh et al, Radiology, 2008

Vein diameter: 3.1 mm

Vein depth: 7.6 mm

Impact of ultrasound guided interventions in immature AVFs

- Among sonographically immature AVF's without interventions, 8/26 (32%) could be used for HD.
- Among sonographically immature AVF's with interventions, 25/32 (78%) could be used for HD.

Singh et al, Radiology, 2008

Summary

- Objective measurements in postoperative ultrasound can predict fistula maturation.
- Ultrasound can identify specific anatomic problems in immature fistulas. Correction of these problems may convert it to a mature fistula.