

Complications associated with high-flow hemodialysis AV access resolved after MILLER

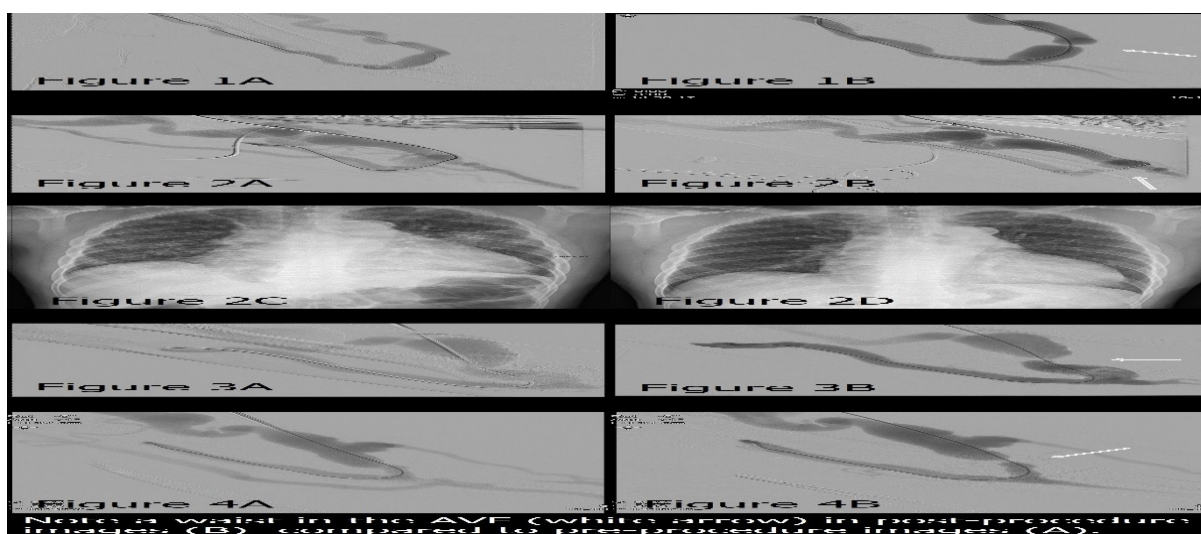
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Background: AV vascular access is necessary for maintaining hemodialysis therapy in end-stage renal disease (ESRD) patients. If access blood flow is inappropriately high, complications such as hand ischemia, arm edema, AVF aneurysm, and congestive heart failure can occur. Surgical management can be an option but Minimally Invasive Limited Ligation Endoluminal-Assisted Revision (MILLER) is a simple and effective procedure to reduce access blood flow. There are few case reports about it, so we present 4 cases where complications caused by high access blood flow were resolved after MILLER.

Case: A 72-year-old woman, who had started hemodialysis 3 months before admission, presented with severe pain and coldness at Lt. hand during hemodialysis, so-called dialysis access steal syndrome (DASS). She had a Lt. brachiocephalic fistula. After MILLER, access blood flow reduced, blood flow to forearm and hand increased, and symptoms improved (Figure 1A, 1B). A 48-year-old man presented with dyspnea due to congestive heart failure with pulmonary edema. He had a Lt. radiocephalic fistula, and access blood flow was 3060 ml/min. After MILLER, access blood flow reduced to 2090 ml/min, cardiothoracic ratio on CXR decreased, and there was no pulmonary edema attack thereafter (Figure 2A, 2B, 2C, 2D). A 54-year-old man presented with repeated edema of Lt. arm and bilateral pleural effusion. He had a Lt. brachiocephalic fistula and access blood flow was 3200 ml/min. After MILLER, access blood flow reduced to 2280 ml/min, and the arm edema and bilateral pleural effusion were resolved (Figure 3A, 3B). A 31-year-old man presented with aneurysmal change at Lt. brachiocephalic fistula needling site. Access blood flow was 3710 ml/min, and after MILLER, it reduced to 2300 ml/min, and the aneurysm did not increase in size thereafter (Figure 4A, 4B).

Conclusion: Complications associated with high access blood flow usually are mild but some of them can be limb- or even life-threatening. MILLER appears to be not only a minimally invasive but also an effective option for treating complications associated with high access blood flow.



Sex/Age	Presentation	Date of MILLER	Access blood flow rate before MILLER (ml/min)	Access blood flow rate after MILLER (ml/min)
F/72	Hand ischemia	2022-10-20	N/A	N/A
M/48	CHF with pulmonary edema	2022-12-06	3060	2090
M/54	Arm edema	2022-12-13	3200	2280
M/31	AVF aneurysm	2023-06-27	3710	2300

Abbreviations: MILLER, Minimally Invasive Limited Ligation Endoluminal-Assisted Revision; N/A, not available; CHF, congestive heart failure; AVF, arteriovenous fistula