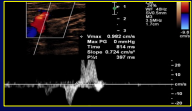


Does Vein Stenting Reduce Great And Small Saphenous Venous Reflux



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No financial disclosures

Chronic Venous Insufficiency (CVI)

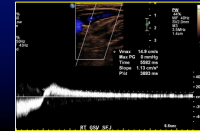
- Most common vascular disorder worldwide
- Venous disease accounts for 2-3% of US healthcare dollars
- Two major pathophysiologic mechanisms of disease:
 - Saphenous reflux
 - Iliac vein obstruction

Saphenous Reflux

- First mechanism elucidated as the etiology of CVI
 - Nicolaides et al.
- Non-invasive diagnosis via duplex ultrasound
- Degree of reflux proportional to symptom severity

Treatment options:

- Endovenous thermal ablation
- NTNT chemical ablation
- Vein stripping
- SFJ ligation

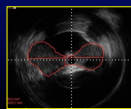


Iliac Vein Obstruction (IVO)

- Increase in awareness & research over past 2 decades
- Proper diagnosis involves venography or IVUS (superior)

Recent double-blinded RCT (Rossi et al., 2018) showed improvement of CVI symptoms and QOL with iliac vein stenting compared to conservative therapy alone

- Treatment options:
- Iliac vein stenting
 - Open surgery



Chronic Venous Insufficiency (CVI)

Current therapies aimed at treating CVI address these two disease mechanisms separately.

We wanted to know:

- Are these pathophysiologic processes related?
- Can correction of IVO with stenting reduce reflux?

Methods – Evaluation and Intervention

Pts with signs and symptoms of CVI had history, physical, and duplex ultrasonography (saphenous reflux >0.5s).

CVI was managed conservatively with compression stockings and NSAIDs for 3 months.

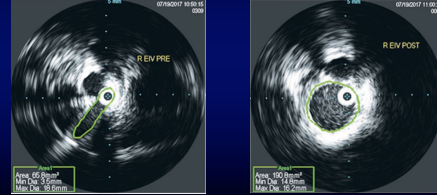
If pts failed conservative Tx, iliac vein interrogation with IVUS +/- venography was offered.

If bilateral intervention was indicated, 2nd procedure was in 1-2 weeks.

Assessment: saphenous reflux before and after iliac vein stent.

Methods – Decision to Stent

If IVUS revealed $\geq 50\%$ stenosis \rightarrow Wallstent placement



Methods – Other Signs of IVO

Venographic evidence of iliac vein obstruction:

- Proximal contrast thinning
- Transpelvic collateralization

As found in various studies, IVUS is superior to venography for diagnosis of IVO.

We use IVUS in all cases.



Results – Patients

2,681 procedures in 1,645 consecutive patients

- 63% female
- Mean age = 66 y

CEAP breakdown

- 25% had edema (C3)
- 51% had skin changes (C4)
- 5% had recently healed ulceration (C5)
- 18% had active venous ulceration (C6)

Results – Procedures

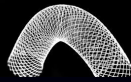
1,033 patients received bilateral stent placement

356 received unilateral left stent placement

259 received unilateral right stent placement

835 procedures excluded from analysis due to lack of complete data or another procedure performed in between pre-stent & post-stent duplex:

- Saphenous ablation
- Sclerotherapy
- Angioplasty



Results – Bilateral Stenting

Limb	Vein Segment	No.	Pre-Stent Average (ms)	Post-Stent Average (ms)	Δ Reflux Average (ms)	p-value
LLE	GSV	637	2123.7 (+/-1624.59)	1724.0 (+/- 1556.39)	-399.7	0.000001
LLE	SSV	339	1471.6 (+/-1363.69)	1111.2 (+/- 1126.63)	-360.4	0.00002
LLE	ASV	32	1513.4 (+/-1735.12)	1424.8 (+/-1278.41)	-88.6	0.77
RLE	GSV	623	2043.9 (+/-1585.36)	1715.4 (+/-1611.42)	-328.5	0.0001
RLE	SSV	351	1548.6 (+/- 1469.69)	1215.2 (+/-1327.15)	-333.4	0.0002
RLE	ASV	22	848.2 (+/- 969.84)	969.8 (+/-1539.56)	121.6	0.09

Bilateral iliac vein stenting reduced GSV and SSV reflux in both limbs.

Results – Unilateral Stenting

Limb	Vein Segment	No.	Pre-Stent Average (ms)	Post-Stent Average (ms)	Δ Reflux Average (ms)	p-value
LLE	GSV	96	2333.5 (+/- 1695.30)	1790.3 (+/- 1800.33)	-573.2	0.004
LLE	SSV	46	1309.1 (+/- 1332.76)	1632.1 (+/- 1261.20)	323.0	0.21
LLE	ASV	7	2320.3 (+/- 2003.65)	1312.6 (+/- 1791.33)	-1007.7	0.30
Limb	Vein Segment	No.	Pre-Stent Average (ms)	Post-Stent Average (ms)	Δ Reflux Average (ms)	p-value
RLE	GSV	77	1924.8 (+/- 1417.71)	1878.3 (+/- 1607.69)	-46.6	0.83
RLE	SSV	30	1778.7 (+/- 1642.43)	1526.5 (+/- 1487.60)	-252.3	0.56
RLE	ASV	2	377.5 (+/- 533.87)	1752.0 (+/- 445.48)	1374.5	0.30

No consistent reduction in saphenous reflux with unilateral stenting.

Implications

- In patients with concomitant superficial venous reflux and IVO, preliminary iliac vein stenting may prevent the need for further saphenous intervention.
- The majority of anti-reflux procedures involve obliteration or removal of the GSV, which may be needed as a conduit for revascularization at a later date.

Limitations & Further Questions

- Retrospective analysis from a single, office-based center
- # of patients excluded from analysis
- Lack of deep reflux measurements
- Why does bilateral stenting have a significant effect, whereas unilateral intervention does not?
- Which patients experience a statistically and clinically significant reduction in saphenous reflux following stenting?