***Roberto: in blu quello che devi modificare e o completare. Doppo me lo rimandi per finalizazione.Poi fare delle corezzioni ed agiunger il tuo lobro.***

Pelvic leak points mini-invasive surgery in woman

Roberto Delfrate, Massimo Bricchi, Claude Franceschi

Objective: The objective of this study was to assess the efficacy of the pelvic leaks surgical disconnection in woman.

Context: Pelvic leak points (PLP) may be responsible for vulvar, perineal and lower limbs varicose veins especially in women during and/or after pregnancy. The accurate anatomical and hemodynamic assessment of these points , perineal (PP) , inguinal (IP) , clitoridian point (C P) and their surgical treatment under local anesthetics as defined by Claude Franceschi (REF: 3 articles + Livre) is a new therapeutic option.

Methods: In this open-label trial 273 pelvic leak points free of pelvic congestion syndrome were assessed and marked with ultrasound and selected when refluxing at Valsalva + Paranà + squeezing maneuvers, then disconnected with mini-invasive surgery under local anesthesia in a single center. Surgery consisted of selective division and non absorbable suture of the refluxing veins and fascias at the PP,IP and CP pelvic escape point.

Results:

Ablation procedures:273 PLP: PP (n= 170), IP (n = 100) and CP ( n=3) .

Follow up: Period =12 to 90 months (Mean = 30.12 months).

Not controlled PLP (n=78).

Controlled PLP (n= 195) where PP (n= 123), IP (n = 72), CP ( n=0).

No Pelvic leak reflux redo ( n = 192)

Pelvic leak reflux redo (n= 3 ) where PP =1,6% ( n=2) and IP =1,4% (n= 1).

Conclusions:

Despite 78 no controlled procedures, this study suggests that pelvic varicose embolization prior PLP reflux ablation is not necessary and indicated only in case of uncontrolled PLP reflux or when combined with pelvic congestion syndrome.
 The accurate ultrasound assessment of each specific pelvic leak as well as a peculiar surgical technique ( vein division , non absorbable suture of veins and fascias ) seems to be the key for satisfactory outcomes.

**ARTICLE**

The objective of this study was to assess the efficacy of the pelvic leaks surgical disconnection without previous or contemporary pelvic veins embolization in patients free of pelvic congestion syndrome.

Several studies [ 1-3]1P. Jiang Non-saphenofemoral Venous Reflux in the Groin in Patients with Varicose Veins *Eur J Vasc Endovasc Surg* 2001; 21: 550-557.**2** 8 F.S. Barros Evaluation of pelvic varicose veins using color Doppler ultrasound: comparison of results obtained with ultrasound of the lower limbs, transvaginal ultrasound, and phlebography *J Vasc Bras* 2010; **3** 15-23.**5** M. Garcia-Gimeno Duplex mapping of 2036 primary varicose veins *JVasc Surg* 2009; 49: 681-689.based on various assessments ( clinical, Ultrasound, venography) consider around 10% of Pelvic Leaks in women varicose where the number of multiparous are 4 times more frequent than in nulliparous ***4*** *N Labropoulos, J Tiongson, L Pryor et al. Nonsaphenous superficial vein reflux J Vasc Surg 2001; 34: 872-877*. Particularly the recurrence after stripping where related to pelvic venous reflux and evaluated 17% **5** M Perrin, N Labropoulos, L. Leon Presentation of the patient with recurrent varices after surgery (REVAS) *J Vasc Surg* 2006; 43: 327-334 but not specifically anatomically defined and not specifically treated . Beside the Obturatory an Gluteal refluxes, Claude Franceschi distinguished with Doppler and imaging ultrasounds three main pelvic leak points (PLP) responsible of varicose veins of lower limbs in mono and multiparous women. (6,7,8) **6** C Franceschi, A. Bahnini Points de fuite pelviens viscéraux et varices des membres inférieurs *Phlébologie* 2004; 57: 37-42.**7** C Franceschi, A. Bahnini Treatment of lower extremity venous insufficency due to pelvic leak points in women *Ann Vasc Surg* 2005; 19: 284-288. **8** Franceschi C. Anatomie fonctionnelle et diagnostic des points de fuite bulboclitoridiens chez la femme (point C). *J Mal Vasc*. 2008;33:42.

 . These PLP are called perineal point (PP), inguinal point ( IP) and clitoridian point (CP). Fig. 1

Frontal view of the pelvis passing through the perineal and inguinal leak points (points *P* and *I*). Note the number of anastomoses (*A*). *1*, vena ovarica (ovarian vein); *2*, tuba uteri vena (fallopian tube vein); *3*, vena uterine (uterine vein); *4*, vena iliaca interna (internal iliac vein); *5*, ligamentum teres uteri vena (round ligament vein of the uterus); *6*, vena pudenda interna (internal pudendal vein); *7*, vena rectalis inferior (inferior rectal vein); *8*, vena pudenda interna rama (internal pudendal branch vein); *9*, vena perinea (perineal vein); *10*, vena femoralis (femoral vein); *11*, vena saphena magna (greater saphenous vein); *12*, vena pudenda externa (external pudendal vein).

PP is the superficial Perineal fascia hole crossed by the Perineal vein that collects the posterior labial vein then connects to the Internal Pudendal vein. The Perineal Vein drains the skin of the perineum then receive the posterior labial veins and pass through the superficial aponeurosis of the perineum (fascia perinalis) by an orifice that we call the perineal point (PP). After crossing PP, the vein ascends with bulbar and cavernous veins to the pudenal vein in the Alcock’s canal. In case of leakage, reflux follows the same pathway in the opposite direction. Reflux can not only cause dilatation of the labial and perineal veins but also extend to the ipsilateral saphenous network through either perineal-to-labial and perineal-to-external pudendal vein anastomoses or through any other incompetent vein in between. It can also feed a controlateral varicosity through labiolabial and perineoperineal anastomoses. Reflux in the medial pudendal artery is itself fed either actively or potentially by any constitutionally incontinent ipsilateral and contralateral upstream genital, visceral iliac, and ovarian vein and by the inferior vena cava.

IP is the superficial inguinal annulus crossed by the Mons veneris veins that connects to the Uterus Round Ligament vein . Reflux of the round ligament vein of the uterus can feed vulvar (labial) and perineal varices and lower extremity varices via residual branches of the Nuck’s canal that reflux directly or indirectly to the subcutaneous abdominal, external pudendal, superficial dorsal of the clitoris, and labial veins, then possibly toward varices in the saphenous network. Once again, reflux in the round ligament vein is itself fed either actively or potentially by any constitutionally incontinent ipsilateral and contralateral upstream genital, visceral, iliac, and ovarian vein and by the inferior vena cava.

CP is the anastomotic plexus between the bulbar vein and superficial dorsal clitoris that connects to the medial pudendal vein **9** PERNKOPF. Atlas of Topographical and Applied Human Anatomy Vol.II. 222-223. Reflux can feed ipsilateral or contralateral perinal and anterior labial vein and or the lateral pudendal then the GSV.

 As the PLP reflux is most of the time fed by Hypogastric tributaries and/or Ovaric incompetent veins, and the PLP reflux occurs as cause of recurrence after conventional stripping, some authors suggest embolization of these veins as a first step of peripheral varicose veins of the lower limbs **10**  J. Leal Monedero Embolization treatment of recurrent varices of pelvic origin *Phlebology* 2006; 21: 3-11. **11** M. Greiner Varices des membres inférieurs d’origine pelvienne : traitement et résultats à long terme *J Mal Vasc* 2006; 31: C2 26.

 In this study, the first step treatment was surgical ablation of the PLP reflux in patients free of pelvic congestion. Pelvic veins embolization as first step was indicated only in case of pelvic congestion syndrome.

PLP represent the escape point of the shunts type IV according to the Teupitz CHIVA classification (12-13)

**METHODS**

**Study Design**

This study was a open-label trial. It consisted of assessing the long term persistence of the surgical ablation at the PLP of the pelvic venous reflux in uni or multiparous women free of pelvic congestion syndrome, partly or totally responsible for lower limbs varicose veins, in absence of prior or secondary pelvic veins embolization and independently of the degree and configuration of the varicosities..The efficacy of the intervention was measured by ultrasounds in a mean follow up period = 30.12 months.

**Participants**

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Clinical data allow diagnosis of vulvar and perineal varices but cannot determine the leak point, since leakage from I, P or C point because they leads to the same clinical manifestations. Duplex ultrasound (preferably color) allows precise identification of I , P and C points. The specific criteria of reflux at the PLP was a Valsalva descending flow provoked by blowing in a blocked straw in standing women. Conversely, the diastolic flow at the descending tributaries of the Great Saphenous Veins (GSV) arch evoked by calf squeezing or Paranà maneuver is not specific and may be present in absence of refluxing PLP, so source of false positive. A continuous reflux at rest ( without any dynamic maneuver) may be due a collateral compensatory draining flow due to a downstream obstacle and so prohibit any disconnection. It was completed by an exhaustive ECD in order to achieve a complete hemodynamic mapping of the venous insufficiency. With the patient in a standing position, IP can be located approximately 1 to 3 cm above the femoral vein and just medially to the epigastric veins and CP medially to the SFJ towards the clitoris. The reflux is seen outwards throughout the inguinal duct. PHOTO da fare. PP is generally located at the junction of the posterior fourth and anterior three-fourths of the labia majorum . It can be located in standing position , the patient posing a foot on an object 20 cms high or in gynecologic position transperineally ( not intravaginally because the probe imaging is to deep respect the the very superficial PP.) The reflux activated by Valsalva maneuver that induces backflow from the Alcock’s canal to the perineal and labial veins. The Alcock’s canal is located medially to and just above the ischiopubic branch (PHOTO da fare)

The study was conducted by the same surgical team who performed ultrasound diagnosis, mapping and pre-operatory marking as well as the operations.

All patients with congenital venous disease, VVs secondary to prior deep vein thrombosis, postphlebitic side-effects, sclerother- apy, associated systemic pathologies, or who refused to participate in the study, refused surgical treatment, were not ambulatory, could not participate in long-term follow-up or had been pregnant less than 9 months previously were excluded from the study.

A written informed consent was provided to the patients

The diagnosis was assessed with echo-color-doppler ECD by the surgeons.

**Interventions**

The patients were ambulatory.

The same surgeon performed the marking and inter­vention.

The anesthesia was ***local : xylocain?***

Incision according skin marking: ***…..cm***

Effective treatment of lower extremity superficial venous reflux of pelvic origin can only be achieved by ligation of the leak points in the same way as is necessary to ligate a refluxing perforating vein or junction. Proximal or distal ligation without ligation at PP and/or point IP will be followed by recurrence due to collateral flow (Fig. [2](http://link.springer.com/article/10.1007/s10016-004-0180-9/fulltext.html#Fig2)) Fig. 2 Ligation of leak points. The perineal and inguinal leak points (points *P* and *I*) act as perforating veins. Remote disconnection (*B, C*) invariably fails either immediately or secondarily because of the presence of many branches and anastomoses.

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Perineal and Genito-crural nerves where preserved respectively at the PP and IP.

Division and stump ligation of the refluxing vein with non absorbable monofilament

PP and IP fascias were also sutured with non absorbable filament..

This procedure was associated at the same time or in a second time with additional shunts disconnections and gravitational hydrostatic pressure segmentation tailored according to each specific hemodynamic configuration according to the CHIVA strategy. **11** Franceschi C. Theorie et practique de la Cure Conservatrice et Hemody- namique de l'Insuffisance Veineuse enAmbulatroire. Precy-sous-thil, France: Edition de l'Armançon; 1988 **12**  Franceschi C, Zamboni P. Principles of venous haemodynamics. Novapublishers. New York. 2010 **13** Franceschi C and al : [CHIVA: hemodynamic concept, strategy and results](http://www.minervamedica.it/en/journals/international-angiology/article.php?cod=R34Y2016N01A0008). [International Angiology 2016 February;35(1):8-30](http://www.minervamedica.it/en/journals/international-angiology/article.php?cod=R34Y2016N01A0008)

**Postoperative Management***(che cosa hai fatto?)*

***Antibiotics: come?***

***All patients were treated with a pressure bandage from the foot to the inguinal zone for 48 hours ?, and then elastic stockings for 4 weeks ?. Analgesic treatment (575 mg Metamizole/8 h) ? and anti­thrombotic prophylaxis28-31 (40 U Enoxaparin/24 h for 10 days) were protocolized***.

**Efficacy Measures**

As measures of safety, most major (deep vein thrombosis, pulmonary thromboembolism, death) and minor (bruises, subcuta­neous inguinal or perineal hemorrhage, neuralgia of the saphenous nerve, wound infection and superficial phlebitis) postsurgical complications were evaluated at 8 days postintervention.***Scrivere le complicanze che sono e non successe:***

*Deep vein thrombosis =*

*Pulmonary thromboembolism =*

*Death=*

*Bruises =*

*Subcuta­neous hemorrhage=*

*Neuralgia=*

*Wound infection=*

*Phlebitis=*

The efficacy of the intervention (the primary end point) was evaluated checking the Doppler response provoked by the Valsalva maneuver at the treated PLP. Reflux was a failure, no reflux was a success.

**RESULTS**

273 PLP where incorporated in the study from 2003 to February 2015 among 4209 CHIVA procedures for lower limbs varicose veins in females and males ( 6,6% ).

Follow up: Period =12 to 90 months (Mean = 30.12 months).

Ablation procedures: 273 PLP: PP (n= 170), IP (n = 100) and CP ( n=3) .

Not controlled PLP (n=78).

Controlled PLP (n= 195) where PP (n= 123), IP (n = 72), CP ( n=0).

No Pelvic leak reflux redo (n = 192)

Pelvic leak reflux redo (n= 3) where PP =1,6% ( n=2) and IP =1,4% (n= 1).

**DISCUSSION**

Despite 78 no controlled procedures, this study suggests that pelvic varicose embolization prior PLP reflux ablation is not necessary indicated only in case of resistant PLP reflux or when PLP is combined with pelvic congestion syndrome. On the other hand the prior pelvic veins embolization leaves behind a PLP reflux, even if reduced which needs per se a complementary superficial treatment.

Sclerosants and foam are used to treat the PLP injecting from the extra pelvic veins. No long term study so far published.

This study doesn’t report the additional CHIVA disconnections nor their specific outcomes because they doesn’t determine the persistence of the PLP treatment.

The low rate of failures may be due to the surgical technique: veins division-ligation and fascia/superficial inguinal channel suture with no absorbable monofilament, which is supposed to avoid at the same time collateral reflux and neoangiogenesis ( inflammatory reaction to absorbable sutures) , as well as the accurate ultrasound localization of the leaking points that allows a very mini invasive operation (Fig 2).

**CONCLUSION**

This study suggests that pelvic varicose embolization prior PLP reflux ablation is not necessary. The latter could be indicated only in case of resistant PLP reflux or pelvic congestion syndrome.
 The accurate ultrasound assessment of each specific pelvic leak as well as a peculiar mini invasive surgical technique ( ambulatory patient, local anesthesia, non absorbable suture of vein stumps and fascias ) seems to be the key for satisfactory outcomes.

***Among treated patients there were no complications except***........



Fig. 2

Ligation of leak points. The perineal and inguinal leak points (points *P* and *I*) act as perforating veins. Remote disconnection (*B, C*) invariably fails either immediately or secondarily because of the presence of many branches and anastomoses.



Fig. 1

Frontal view of the pelvis passing through the perineal and inguinal leak points (points *P* and *I*). Note the number of anastomoses (*A*). *1*, vena ovarica (ovarian vein); *2*, tuba uteri vena (fallopian tube vein); *3*, vena uterine (uterine vein); *4*, vena iliaca interna (internal iliac vein); *5*, ligamentum teres uteri vena (round ligament vein of the uterus); *6*, vena pudenda interna (internal pudendal vein); *7*, vena rectalis inferior (inferior rectal vein); *8*, vena pudenda interna rama (internal pudendal branch vein); *9*, vena perinea (perineal vein); *10*, vena femoralis (femoral vein); *11*, vena saphena magna (greater saphenous vein); *12*, vena pudenda externa (external pudendal vein).



Fig. ?

Perineal view showing the perineal and inguinal leak points (points *P* and *I*). Note the number of anastomoses (*A*). *1*, vena pudenda interna (internal pudendal vein); *2*, vena perinea (perineal vein); *3*, vena rectalis inferior (inferior rectal vein); *4*, vena bulbi vestibuli et clitoridi (vein of bulb of vestibule and clitoris); *5*, vena pudenda externa (external pudendal vein); *6*, ligamentum teres uteri vena (round ligament vein of the uterus); *7*, vena saphena magna (great saphenous vein); *8*, vena glutea (gluteal vein); *9*, vena ischiatica (sciatic vein); *10*, vena obturatoria (obturator vein); *11*, vena femoralis (femoral vein).

1. e saphenous vein sparing surgery for future grafting. Panminerva Med. 1995;37:190-197.