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SHORT COMMUNICATION EMBOLISATION (ARTERIAL)

Arterial Embolization of Joint Synovitis: The Latino Registry. Midterm Follow-Up of the Latino-Hip Cohort for Greater Trochanteric Pain Syndrome

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Abstract

Purpose To present the midterm follow-up of a cohort of 31 patients with great trochanteric pain syndrome (GTPS) refractory to conservative management or physical therapy and no indication for surgery treated with embolization of the lateral femoral circumflex artery (LFCA).

Material and Methods Single-center prospective cohort from June 2019 to July 2023. This paper is an update of the initial experience with embolization of LFCA, previously published. Visual analog scale (VAS) was used to compare the symptoms before and after midterm follow-up. Technical success was considered when at least one artery responsible for the hyperemic synovium was embolized. Complications and adverse events were noted.

Results Thirty-one patients (38 joints) were included; mean age was 68.89 (+ 11.22) years. Thirty-six joints were treated with imipenem/cilastatin (I/C) alone, one with 100–300 µm BeadBlock and one using Microsphere 100–300 µm and I/C combined. 64.5% of the joints showed an association of GTPS with hip osteoarthritis on MRI pre-procedure.

On the last FU 21 joints presented VAS 0 to 3, seven joints VAS 4 to 6 and nine did not feel any improvement, with VAS 7 to 10. One patient was lost to follow-up. Two patients present a minor complication (posterior tight numbness), spontaneously improved within 30 days.

Conclusion Lateral femoral circumflex artery embolization is feasible, and it is an alternative in pain reduction in patients with hip GTPS refractory to clinical treatment and no indication for surgery, in midterm follow-up.

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Graphical Abstract

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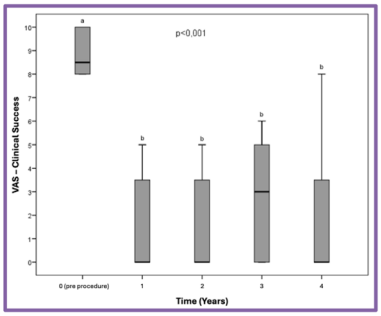
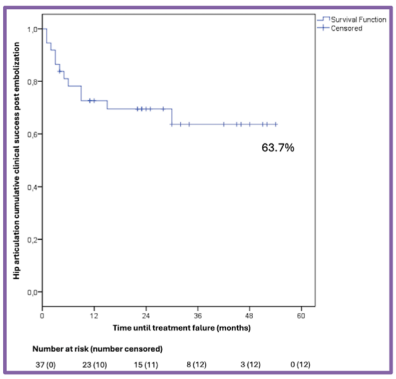
arteriaL embolizATIon of joiNt synOvitis: the LATINO registry.
Midterm follow-up of the latino-hip cohort for Greater Trochanteric Pain Syndrome

MAIN RESULTS	
Patients	31
Joints	38
Mean age	68.89 years
Mean follow up	35.2 months
Reduction of nigth pain	87.17%
No used of pain medication in last follow up	66.67%
Skin descoloration	18%
Posterior tight numbnness	5.4%
Osteonecrosis	0%
VAS on last FU	**Number of patients**
Zero	18
1 to 3	3
4 to 6	7
7 to 10	9





Lateral femoral circumflex artery embolization is feasible, and it is an alternative in pain reduction in patients with hip great trochanteric pain syndrome refractory to clinical treatment and no indication for surgery, in midterm follow-up.

Keywords Musculoskeletal embolization · Great trocantheric pain syndrome · Osteoarthritis · Coxarthrosis · Synovitis · Bursitis

Introduction

Greater trochanteric pain syndrome (GTPS) describes a source of trochanteric pain derived from pathology of the trochanteric bursae, gluteus medius and minimun tendons and iliotibial band [1]. Conservative measure improves the disease in 90% of cases [2]. Surgery is indicated in 10% of cases refractory to those measures [2]. Transarterial embolization for musculoskeletal has emerged as an alternative in reduction of pain in patients with GTPS and osteoarthritis (OA) with good mild-term results [3].

The purpose of this study is to present the midterm follow-up of the first LATINO-HIP study [1].

Material and Methods

The LATINO (arteriaL embolizATIon of joiNt synOvitis) registry aims to evaluate the results of musculoskeletal embolization. The LATINO-Hip is the subgroup of patients with GTPS treated with lateral circumflex femoral artery embolization (LCFAE).

This is the update of a prospective single-center cohort started in June 2019 approved by the Ethical Committee with number 52368120.7.0000.5342 previously published in 2022 [1]. Informed consent was achieved prior to procedure in all patients. Patients presenting with hip pain for more than 6-month refractory to conservative management or physical therapy and no indication for surgery were referred from orthopedic team to the interventional radiology team.

Inclusion criteria were lateral hip pain refractory to conservative management for at least 6 months; visual analog scale (VAS) of pain > 6/10; acute pain or tenderness during palpation and maneuvers of the hip and MRI findings of bursitis, tendinopathy or OA. Exclusion criteria were infection, previous hip trauma, malignancy, peripheral artery disease and coagulopathy.

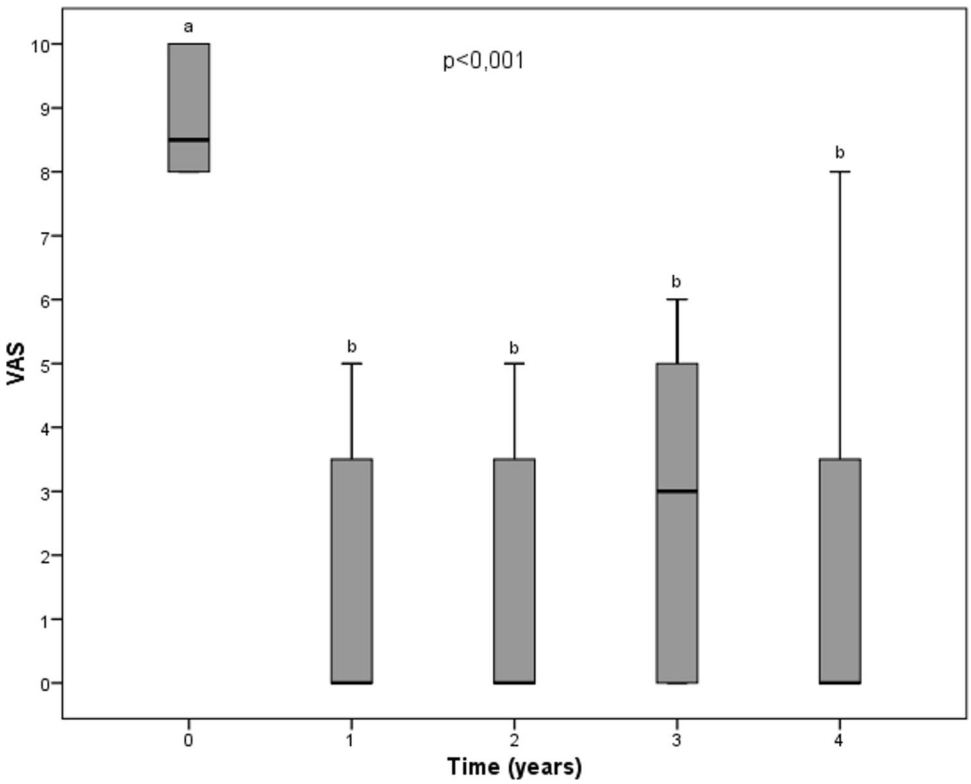


Fig. 1 Median VAS pre- and post-hip embolization. Figure 1: Boxplot graph showing the 25th and 75th percentiles at its ends and the median represented by the bold line. Median VAS pre-procedure was 8.5 compared to zero on the first- and second-year FU, three on the third year and zero on the fourth-year FU. There is a statistically significant difference over time (Friedman test, $p < 0.001$). This difference was located between the VAS pre- and the other times (which do not differ significantly from each other)

Follow-up

Follow-up was performed in 30 days and every 3 months in the first year and then annually by phone call. Technical success was determined by embolization of at least one artery and interruption of the neovascularization, maintaining normal arterial flow. Clinical success was considered if the patients reported VAS 0–3. Secondary success was defined as patients self-report of pain that does not impair their activities, regardless of the VAS score and reduction of medication use. If there was VAS > 4, a clinical evaluation was performed. To compare the VAS over time, the Friedman test was used, followed by the Dunn Bonferroni post hoc test.

Technique

The procedure was performed under local anesthesia and no sedation. Patient collaboration was used to identify the correct points of pain. [1]

Contralateral femoral access was achieved for access of the ipsilateral profunda femoral artery using internal mammary (IM) 4-5Fr catheter with a 2.0–2,4Fr microcatheter inserted coaxially to access the branches of the ascending branch of the LFCA, according to the areas identified in the preoperative MRI and areas of reported pain in physical examination. The hypervascular area was identified, and embolization was performed using imipenem/cilastatin (I/C) diluted 500 mg: 10 ml with contrast media. The I/C solution was injected in 0.3 cc increments until occlusion of the hyperemic area, while preserving normal circulation. In cases of GTPS with a fistula-like pattern of blush, 100–300-µm microspheres were used.

Results

Between June 2019 and July 2023, 31 patients and 38 joints were treated with LCFAE. Two patients completed five years of follow-up and 12 completed four years. Patients that completed at least one year of follow-up were included in the analysis. One patient was lost to follow-up. The median FU was 22 months (IQR 20). Twenty-eight (87.5%) were females, and 3 were males (12.5%). The mean age was 68.89 (+ 11.22) years. Median visual analog scale of pain (VAS) pre-procedure was 8.5 (8–10) (Fig. 1).

MRI findings demonstrated association of bursitis, tendinopathy and OA in 19.35% of joints. Bursitis and OA were found in 3.22%; tendinitis and OA in 41.93%; and tendinitis with bursitis in 9.67% of the joints. Isolated bursitis and tendinopathy were found in 12.9% and 12.9% of joints, respectively.

Seven patients had bilateral hip embolization at the same procedure. Thirty-six joints were treated with I/C, one with 100–300 µm BeadBlock and one using

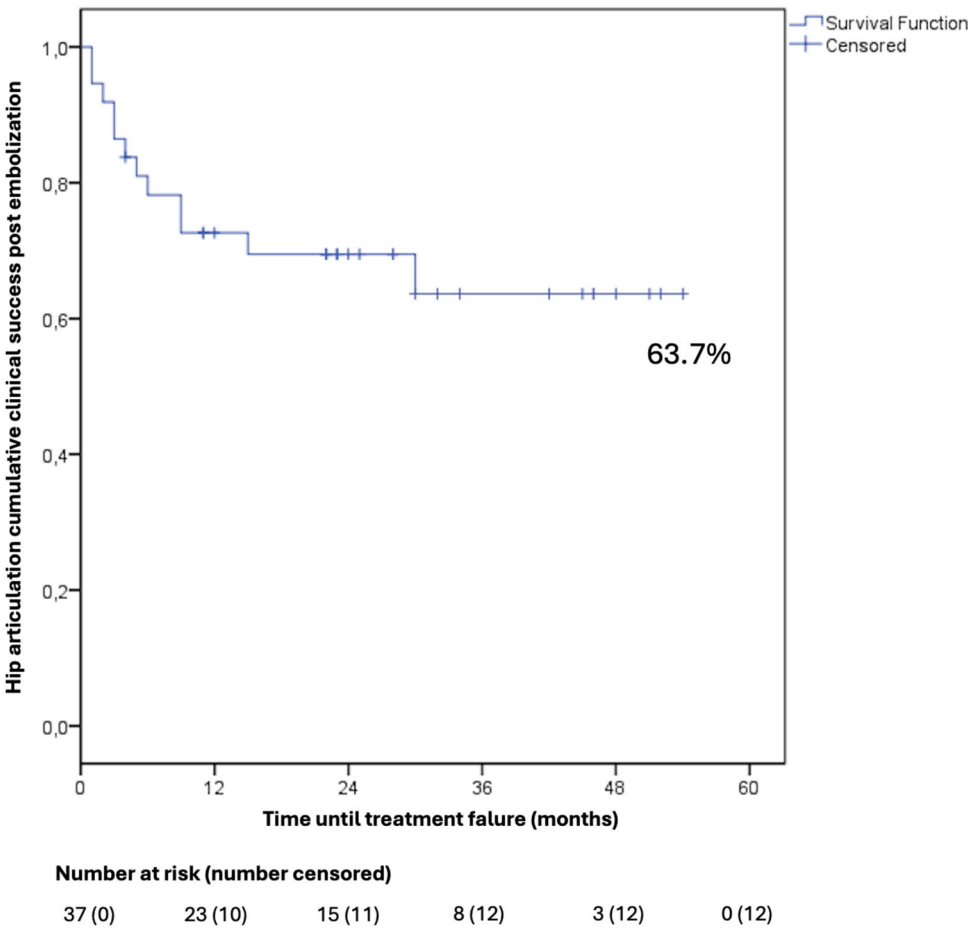


Fig. 2 Kaplan–Meier estimates the cumulative clinical success after transarterial embolization of GTPS. Figure 2: Kaplan–Meier curve showing that after 30 months the secondary clinical success curve stabilizes in 63.7% of patients

Table 1 Main results

Main results	
Patients	31
Joints	38
Mean age	68.89 years
Mean follow-up	35.2 months
Reduction of night pain	87.17%
No used of pain medication in the last follow-up	66.67%
Skin discoloration	18%
Posterior tight numbness	5.4%
Osteonecrosis	0%
VAS on last FU	**Number of patients**
Zero	18
1 to 3	3
4 to 6	7
7 to 10	9

Microsphere 100–300 µm and I/C combined. Technical success was achieved in 100% of cases.

The median VAS on the one-year FU was zero, followed by zero on the second year, three on the third, zero on the fourth and three in the fifth year of FU. There was a statistically significant difference ($p < 0.001$) in VAS in all times versus pre-embolization (Fig. 1).

Skin discoloration was found in 18% of patients with spontaneous improvement in the first 30 days with no intervention. An initial worsening of pain in the lateral tight was found in eight patients, improved within 20 days with 7 days of non-steroid drugs.

On the last FU, 21 (56,75%) joints presented VAS 0 to 3, seven VAS 4 to 6 and nine joints VAS 7 to 10, meaning those patients did not feel any improvement. Reduction of night pain was reported in 87.17%, and 66,6% patients are not using pain medications. Secondary success demonstrated in the Kaplan–Meier curve (Fig. 2), with 63.7% of patients reporting feeling better than before the procedure.

There were four groin hematomas, all spontaneously resolved with no intervention. No osteonecrosis was evidenced. No major adverse events were found in this cohort (Table 1). There was no report of paresthesia since the short-term follow-up [1], but two patients experienced numbness in the hip region during the early stages of the study, which was considered a minor complication.

Discussion

The three main components of GTPS are the trochanteric bursitis, gluteus medius and gluteus minimus tendinopathy, and the external coxa saltans [5]. Bursitis has an inflammatory component, and in tendinopathy, there is the presence of neovascularization [4–6]; consequently, transarterial embolization is as an alternative treatment for GTPS which reduces the inflammatory blush and the process of inflammation and neovascularization [1, 3].

There are more than half of the patients referring clinical success on the last FU. Also, the median VAS in all FU was in the clinical success rate, meaning that at least half of patients had clinical success maintained over the years. Corticosteroid injections on the contrary have an average duration of pain reduction of up to 12 weeks [7].

This paper is the update of the initial experience with LFCA embolization for hip synovitis [1, 3]. Imipenem/cilastatin remains the preferred embolic agent due to its theoretical advantage of preventing ischemia [8]. There was no short- and long-term evidence of aseptic hip necrosis (AHN), which was a concern in previous studies. No patient was submitted to hip replacement with pathological evidence of the disease.

These findings so far are similar of GAE, where reports of osteonecrosis are unusual [9, 10].

The two cases of posterior thigh numbness at the beginning of the study were the only adverse events observed in this cohort. Since these events were not observed in other patients, they may be attributed to the learning curve. Using small amounts of embolic agent in each injection will help prevent non-target embolization.

This study has limitations. Patient report of symptoms and the no use of validated scores makes information subjective. Moreover, this is a small, single-center study. MRI was not performed in all patients after 6 months, compromising image information of osteonecrosis. In addition, although hip OA and GTPS are associated, the analysis of both treatment in this study may be a confounder.

Conclusion

Lateral femoral circumflex artery embolization is feasible, and it is an alternative in pain reduction in patients with hip GTPS refractory to clinical treatment and no indication for surgery, in midterm follow-up.

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Author Contributions MPC, RCP, RM, JNS, RSN, LBB, JCB performed the procedures; MPC, CBG, LJ performed follow-up; MPC, CBG, JMMLF, RCP, EBJ, RM, JNS, RSN, JCB wrote and performed critical review of the paper; MPC helped in overall responsibility.

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Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Consent for publication All participants have signed the informed consent.

Ethical approval and Informed consent This is a retrospective study from a prospective cohort. Informed consent was created and approved at the University of Passo Fundo Ethical Committee. Study was approved by the Ethical Committee with number 52368120.7.0000.5342.

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