No interest for a second close infiltration of platelet-rich plasma to treat upper patellar tendinopathies

KAUX Jean-François, CROISIER Jean-Louis, BUHLER Frédéric, SAVANIER Betty, LE GOFF Caroline, DELCOUR Sandra, GOTHOT André
Introduction

- **PRP** = new treatment for *chronic* tendinopathies.

- Degranulation ➔ various cytokines and *growth factors* ➔ promote angiogenesis, tissue remodeling and tendon healing.

- *In vitro* and animal experiments ➔ **improve** tendon healing process.

- Clinical series = *controversy*.

- Studies are difficult to compare, using *different* PRP preparation methods yielding *varying qualities*, various injection methods, and different post-infiltration protocols.
Introduction


- Most studies have evaluated the effects of **3 successive infiltrations**.

- However, the multiplication of infiltrations can reasonably be expected to *increase the risks of complications*, and moreover, this treatment can be *expensive*.

- **For these reasons it seems relevant to evaluate the relative efficacy of 2 infiltrations of PRP to that of a single treatment.**
Methods

• All experimental procedures and protocols used in this investigation were reviewed and approved by the Ethics Committee of the University Hospital of Liège (Belgium).
Methods

- **20 patients** (men) with jumper’s knee.
- **Rebel** to conservative treatment (eccentric, ESWT...).
- Symptoms for at least 3 months.
- **Randomized** into 2 groups (1 or 2 infiltrations of PRP).
Methods

• The assessments were made using (before the infiltration of PRP, and at 6 weeks and 3 months after the injection):
  • VAS
  • Pressure Algometer
  • IKDC and VISA-P
  • Isokinetic and Optojump assessments
  • US + Doppler
Methods

- PRP obtained using an apheresis machine (COM.TEC).
- Platelet concentration: around $9 \times 10^5$ platelets/µL.
- 300µL of CaCl$_2$ were added to the PRP to activate the platelets.
- 6mL of PRP were injected into the patellar tendon after disinfection and US tracking, without local anesthetic.
- Local cryotherapy immediately following the infiltration.
- NSAIs drugs avoided.
Methods

• A second infiltration of 6mL of PRP to subjects of Group 2.

• After 5 to 7 days → standardized progressive sub-maximal eccentric program (3 times a week).

• The angulation and the number of sessions progressively increased (from 60° to 90° and from 5 to 7 sessions of 15 to 20 repetitions respectively).

• Electro-stimulation, stretching of the quadriceps, cryotherapy.

• Ten minutes of cycloergometer exercise, using low resistance (2 weeks after the second treatment), and proprioception exercises (after 1 month).
Methods

• Evolution over time for both groups was studied using generalized linear mixed models (GLMM).

• Results were considered significant at the level of uncertainty of 5% ($p<0.05$).

• Statistical analyses were conducted using Statistical Analysis System version 9.3 software (SAS Institute).
Results

• Patient age (± 30 y.o.) and duration of symptoms (± 17 months) = similar for both groups (p=0.68).

• Concentration PRP (± 9 x 10⁵/µL), with virtually no red (<0.001 x 10⁶/µL) nor white cells (<0.001 x 10³/µL).
Results

(a) VAS
(b) Algometer
(c) KDC
(d) VISA-P
Results

- No improvements in *isokinetic* physical performance.
  - Pain during E30 significantly decreased over the 3-month follow-up period ($p=0.027$).
- No improvements in *jumping performances*.
- No improvements in *US* findings.
Discussion

- Chronic jumper’s knee (>3 months) unresponsive to conservative management.
  - Including long term eccentric rehabilitation (> 20 sessions) and ESWT.

- Treatments stopped at least 1 month prior to inclusion to avoid bias due to these management strategies.

- Both groups were comparable: subject ages were similar and groups were homogenous for the different parameters studied.
Discussion

• **No** side effects were reported.

• We observed a very **similar significant** improvement in **algofunctional status** (VAS, algometer, IKDC and VISA-P) in both groups as little as **6 weeks** after the infiltration of PRP. This improvement continued up to **3 months** following the procedure.

• These results confirm the effectiveness of the **algofunctional status** after infiltrations of PRP in cases of patellar tendinopathy whatever the number of infiltrations (Volpi 2007; Kon 2009; Brown 2010; Filardo 2010 & 2013; Kaux in press).
Discussion

• Following the infiltration of PRP, it is necessary to apply a sub-maximal eccentric load to guide the tendon healing process (Virchenko 2006; Kaux 2013).

• Isokinetic and Optojump performances not significantly modified (probably due to the great SD between patients).

  • Pain during eccentric activity of the quadriceps (the most demanding exercise applied on the patellar tendon) significantly decreased over time in the both groups.
Discussion

• Contrary to other studies (Volpi 2007; Kon 2009; Filardo 2010 & 2013), imaging findings in our study did not show any decrease of the pathological lesion.

• As demonstrated, a trend for increased vascularity up to 6 months following PRP infiltration could be observed (Chaudhury 2013). Besides, it is well established that there is a clear delay between clinical observation and imagery findings (Khan 2003).

• As the healing process of tendon has not concluded after 3 months, we encouraged patients to continue with the rehabilitation program at home for minimum 12 weeks.
Discussion

• Our study presents some minor limitations:

  • We compared 2 groups with infiltrations of PRP, but we did not have a real control group. However, the aim was to evaluate outcomes of 1 and 2 infiltrations of PRP, not to compare the effect of PRP against a control group.

  • As we compared 1 infiltration of PRP to 2 infiltrations 15 days apart, evaluations of Group 2 took place 2 weeks after those of Group 1. However, the evaluation delay after the last infiltration was identical for both groups (6 and 12 weeks).

  • The addition of a 1-year follow-up could facilitate observation of results at a more long term evolution.
Conclusion

• A local infiltration of PRP associated with a sub-maximal eccentric protocol is an efficient treatment to improve symptoms of chronic jumper’s knee unresponsive to other conservative treatments.

• However, the application of 1 or 2 infiltration of PRP did not reveal any difference between the 2 groups after a follow-up period of 3 months.

• A second closely-timed infiltration of PRP to treat upper patellar tendinopathies does not seem relevant in improving the efficacy of this treatment in the short term.

• However, these results must be evaluated over the longer-term.

• A second infiltration should perhaps be envisaged later, but this remains to be demonstrated.
Thank you for your attention!