



Distal humeral non-union after repeated failure of internal osteosynthesis and the use of Autologous Conditioned Plasma (ACP) to enhance union. A case report.

Khaled Kabbani, Vasilios Gavrielatos, Ioannis Theodosis, Fotios Tilkidis, Tilemachos Papageorgiou
Orthopaedic Clinic, University Hospital of Ioannina

ABSTRACT

We present a challenging case of a distal humeral fracture who was treated by us with open reduction – internal fixation. The patient was a heavy smoker and a manual laborer. After surgery he was lost from follow up and presented 6 months postoperatively with a failed osteosynthesis and a hypertrophic non-union, which we treated by ORIF and a heterogenic bone graft. Three months later he developed a loosening of the plate. We stabilized the humerus with a Sarmiento splint and one month later we infused the site of the non-union under fluoroscopy with Autologous Conditioned Plasma (ACP), that showed promising results.

CONTACT

Khaled Kabbani
Ορθοπαιδική Κλινική ΠΓΝΙ
kabbakha@gmail.com

INTRODUCTION

Despite the fact that most humeral fractures do well after treatment, they still have a non union rate of about 10%. Follow up and controlled exercises for early range of motion of the elbow are mandatory to prevent contractures. We present a challenging case of a distal humeral fracture who was treated by us with open reduction – internal fixation. The patient was a heavy smoker and a manual laborer. After surgery he was lost from follow up and presented 6 months postoperatively with a failed material osteosynthesis and a hypertrophic non-union, which we treated by ORIF and a heterogenic bone graft. Three months later he developed a loosening of the plate. We stabilized the humerus with a Sarmiento splint and one month later we infused the site of the non-union under fluoroscopy with Autologous Conditioned Plasma (ACP).

METHODS AND MATERIALS

We present a case report and a short review of the literature.

A 50 years old heavy manual laborer was operated on by us, for a distal humeral fracture (AO type 13A2) by open reduction and internal fixation (**Image 1**). The patient was lost in follow-up and presented after 6 months with failure of the osteosynthesis and non-union (**Image 2**). Using the same posterior approach, we debrided the hypertrophic non-union and we used a heterogenous bone graft and revised the fixation. Three months postoperatively the follow up x-ray revealed a loosening of the plate (**Image 3**). We stabilized the humerus with a Sarmiento humeral spica splint for one month and then infused the fracture sight with ACP.

We reexamined the patient monthly for the first five months and then afterwards every 3 months.

We also used PubMed and Google Scholar to look for clinical studies on using platelet rich plasma (PRP) in treatment of humeral pseudarthrosis in the English language. The key words used were (platelet rich plasma OR autologous conditioned plasma AND distal humeral fractures OR distal humeral pseudarthrosis).

RESULTS

One month after the infusion of ACP the fracture showed signs of union, with total union 3 months after the infusion (**Image 4**). The patient presented a full range of motion of the elbow and returned to his daily routine postoperatively (**Image 5**)

After filtering according to the type of studies we ended up with 156 clinical studies. We excluded studies with patients younger than 18 years old, case reports and series with less than 10 patients. 31 articles remained from those after reviewing the full text of each. Just 5 studies were eligible to be used. A meta-analysis review study with 420 patients was excluded because of inability to check for the homogeneity and we ended with 4 studies.

One retrospective and three prospective studies. A total of 168 cases with established malunions of long bones. All of them were surgically treated and autologous bone graft and injected with plasma rich plasma. Bone union was seen by the end of the 4th month in 82 out of total 92 (87,2%)from the first study, in all the 30 (100%)of the second study, 17 out of 20 (85%) of the 3rd study. All the 14 patients who were injected with PRP in the 4th study showed union at a mean of 5.3 months while the 10 the placebo group patients needed a mean of 11.3 months to heal.

CONCLUSIONS

Injecting ACP at the sight of the fracture is an effective way in treating non-union of long bone fractures, including humeral fractures, as our case report showed. However more double blinded, randomized clinical trials and in vitro studies need to be performed in order to gain more evidence that support the efficacy of ACP in achieving union in humeral fractures

REFERENCES

1. Effects of Platelet Rich Plasma on Healing Rate of Long Bone Non-union Fractures: A Randomized Double-Blind Placebo Controlled Clinical Trial
Fariborz Ghaffarpasand 1, Mostafa Shahrezaei 2, Maryam Dehghankhalili 3
Bull Emerg Trauma. 2016 Jul;4(3):134-40.
2. Platelet-Rich Plasma Combined With Autologous Grafting in the Treatment of Long Bone Delayed Union or Non-union: A Meta-Analysis
Weijun An 1, Peng Ye 1, Tao Zhu 1, Zhizhong Li 1, Jianbin Sun 1
Front Surg . 2021 Jun 4;8:621559.
doi: 10.3389/fsurg.2021.621559. eCollection 2021.
3. The effect of platelet-rich plasma on fracture healing in long-bone pseudoarthrosis
Koray Başdelioğlu 1, Gökhan Meriç 2, Serdar Sargin 3, Aziz Atik 3, Ali Engin Ulusal 3, Devrim Akseki 3
Eur J Orthop Surg Traumatol . 2020 Dec;30(8):1481-1486.
doi: 10.1007/s00590-020-02730-2. Epub 2020 Jul 2.
4. Role of autologous platelet-rich plasma in treatment of long-bone nonunions: a prospective study
R. Malhotra, V. Kumar, B. Garg, R. Singh, V. Jain, P. Coshic & K. Chatterjee
MUSCULOSKELETAL SURGERY volume 99, pages243–248 (2015)
5. Autologous platelet injection in the treatment of long bone nonunion: A prospective interventional study
Dr. Sujay K Mahadik, Dr. Satish Mehta, Dr. Shrikant Deshpande and Dr. Nagesh Naik international Journal of Orthopaedic science DOI: <https://doi.org/10.22271/ortho.2018.v4.i3d.336>.
6. Assessment of autologous platelet gel injection in nonunited long bones
Ayman Tawfik11, Noha Kamel22 Year : 2017 Volume : 42 Issue : 1 Page : 31-35



Image 1. 1st Postoperative Xray.



Image 2. Failure of osteosynthesis after primary surgery.



Image 3. Loosening of the plate after revision surgery.



Image 4. Union at 5 months after ACP



Image 5. Full range of motion at last follow up.