

Format for ANSWERING REVIEWERS

July 15, 2015



Dear Editor,

Please find enclosed the edited manuscript in Word format (ESPS Manuscript NO: 19924).

Title: Modified porous tantalum rod technique for the treatment of femoral head osteonecrosis

Author: Emilios E Pakos, Panayiotis Megas, Nikolaos K Paschos, Spyridon A Syggelos, Antonios Kouzelis, Georgios Georgiadis, Theodoros A Xenakis

Name of Journal: *World Journal of Orthopaedics*

ESPS Manuscript NO: 19924

The manuscript has been improved according to the suggestions of reviewers and We highlighted the changes made to the manuscript according to the peer-reviewers' comments as requested;

Comments

Reviewer 1

We thank the reviewer for the appreciation of our work and his effort to further improve our work. We have addressed his comments as follows:

There are a few spelling errors which need correcting

As suggested the spelling errors were corrected

However, for I would request that the authors provide further information on conversion to THA in the revised manuscript. Tantalum can be very hard to remove once osseointegrated...what difficulties did they have with this when converting to THA. Did they have any trochanteric

fractures? Did they need to do anything to address bone loss on removing the implant? A post tantalum removal THA radiograph should be included to document this.

As suggested by the reviewer we provide further information on conversion to THA in the revised manuscript.

Firstly as we clearly state in the Materials and Methods-Surgical technique section: “Although the initially described technique involved the measurement of the canal and the placement of the lateral part of the rod at the lateral femoral cortex, we used shorter rods in the majority of the patients so that the rod ended distally at the cancellous bone of the trochanteric area. This method enabled the easier removal of the rod (the lateral edge of the rod was at the level of femoral head osteotomy) and the filling of the cortical defect with bone in case of future arthroplasty”

Moreover, we have added in the Results section of the revised manuscript the following paragraph: “In 2 of the hips that were converted to THA, the removal of tantalum rod was easily performed due to the fact that the rod was shorter ending distally at the cancellous bone of the trochanteric area at the level femoral head osteotomy. In 2 patients where the lateral part of the rod was placed at the lateral femoral cortex, the conversion was performed with the osteotomy cut through the rod (**Figure 6A**) and the lateral part of the rod was carefully removed with the use of a leyer chisel. No trochanteric fracture was noticed. The trochanteric hole was filled with morselized bone graft from the femoral head and the 6-week postoperative x-rays showed callous formation (**Figure 6B**). The 12 and 24 months postoperative x-rays in these patients did not showed any apparent change.”

Reviewer 2

We thank the reviewer for the extensive revision of our manuscript, the valuable comments and the opportunity to improve our work. We have addressed these comments as follows:

This is a retrospective study with limited sample sizes. The techniques were not clearly described. The citation of literature and discussion of cons of implant was not balanced. The following suggestion are attempt to improve quality of the manuscript. 1. Please correct all the typos and grammar errors.

As suggested we have corrected all typos and grammar errors

2. Describe how aspiration was done to obtain growth factors, and how the growth factors were

added to the tantalum rod. Were growth factors analyzed in a lab? if not, then the authors cannot claim they added growth factors to the rod or the decompression site. They can only say: bone marrow aspirates.

A suggested we describe in the revised manuscript the aspiration technique and how the growth factors were added to the tantalum rod. Moreover, since the growth factors were not analyzed in the lab, we have rephrased throughout the manuscript the wording “growth factors” with the suggested wording “bone marrow aspirates”.

We have added the following in the Materials and Methods -Surgical technique section: “The next step involved bone marrow aspiration from the ipsilateral anterior iliac crest. A 5-mm incision was performed approximately 3–4 cm posterior to the anterior superior iliac spine directly on the crest. A 16-gauge aspiration needle was advanced into the bone marrow with an angle of 15 degrees cephalad by rotating it in an alternating clockwise/counter clockwise motion. The needle was advanced approximately 4–6 cm into the cancellous bone. The stylet/trocar was removed and a heparin-coated 30-ml syringe was adjusted onto the needle. 30 ml of bone marrow aspirates were obtained. If no bone marrow is obtained, the needle was reoriented within the ilium, and the aspiration was repeated.

The aspirates were divided in 2 equal parts. The first part was mixed with the morselized bone graft from the canal reaming and was then placed into the canal and was pushed to reach the necrotic area. Finally, the tantalum rod (Zimmer, Inc, Warsaw, IN, USA) was impregnated with the second part of bone marrow aspirates (Figure 2). The impregnation was performed by immersing the rod into the aspirates for 5 minutes.”

3. The core decompression track was 10 mm and the Tantalum rod was also 10 mm, did authors notice any intra-operative event of fat embolism as reported by Schaffer JC, et al: Am J Orthop (Belle Mead NJ). 2014 Jun;43(6):275-9. Please discuss this techniques and concerns for fat emboli.

No intra-operative event of fat embolism was noticed. We have added in the Results section-1st paragraph-4th line the wording “(i.e. fat emboli)” after the word “intraoperative”.

Moreover, we have added the following sentence in the Discussion section including the suggested reference: “Previously reported complications from the use of tantalum rod such as fat embolism ^[34] and subtrochanteric fractures ^[35] were not seen in our series.”

4. *In the introduction section, the authors mentioned a few theories of pathogenesis, but omitted adipogenesis of bone marrow, which is closely associated with steroid and alcohol use and an important factor associated with development of osteonecrosis (Seamon J, et al: Arthritis. 2012;2012:601763). Please add this information.*

As suggested we have added the adipogenesis of bone marrow in the pathogenesis of osteonecrosis. We have added the wording “adipogenesis of bone marrow” in the Introduction section, 2nd paragraph, 4th line. We have also added the suggested reference. Accordingly, all reference numbers and citations in the text were changed.

5. *The author need to describe the degree of necrotic bone removal under endoscope. complete or partial removal? what tools were used? how did authors overcome the challenges of deep and narrow tunnel that make the regular burr unusable? If the dead bone was completely removed, then the authors basically made the core decompression tract a fresh healthy bleeding bone surface so bone graft and tantalum rod will have the advantages to heal the lesions. This should be discussed in detail.*

The dead bone was partially removed with small drills using a threaded kirschner wire through the canal. No complete removal of necrotic bone was performed. In the Materials and Methods-Surgical technique section we have added the word “partial” after the word “curettage” and we have also added the following sentence at the end of the first paragraph: “The curettage was performed with small drills into the necrotic lesion using a threaded flexible Ø3.2x450mm kirschner wire through the canal.”

6. *There are many reports showing inferior outcome of tantalum rod for osteonecrosis, the authors need cite more studies and discuss disadvantages of such device so you have a balanced discussion.*

As suggested we have modified the beginning of the 3rd paragraph of the discussion as follows: “Several studies have evaluated the efficacy of porous tantalum rod in the treatment of femoral head osteonecrosis, with controversial outcomes. In the majority of these studies porous tantalum rod has proven an effective and safe management for osteonecrosis of femoral head [24,25,26]. However, other studies showed poor out-comes with high rates of conversion to THA [27].

7. *The ARCO committee recommended using osteonecrosis instead of avascular necrosis. Therefore I suggest the authors change the term AVN to Osteonecrosis of the femoral head throughout the*

entire manuscript.

As suggested the term "AVN" was replaced throughout the entire manuscript with the term "osteonecrosis"

All changes have been highlighted in the text.

All authors have reviewed and approved the final version of the manuscript.

We thank you in advance for your consideration

Yours sincerely,

Corresponding author

Format for ANSWERING REVIEWERS



September 1, 2015

The Editor

World Journal of Orthopaedics

Dear Editor,

We are happy to hear that you will consider a revised manuscript for publication to the World Journal of Orthopaedics. As you had suggested we are re-submitting our manuscript entitled “Modified porous tantalum rod technique for the treatment of femoral head osteonecrosis” (Ms No 19924) for your consideration for peer-review and publication in *World Journal of Orthopaedics*. This is a revised version of our manuscript where we have addressed in detail all the comments of the editor that were contributed to our previous submission. We are grateful for the very insightful and helpful suggestions and for giving us the opportunity to improve our work.

Comments

Page 4, Line 75: “---were evaluated clinically with the Merle D’Aubigne and Postel score and radiologically.” The authors did not provide consistent information regarding “Merle D’Aubigne and Postel score” later in the text.

As suggested we provide in the revised version information regarding the Merle D’Aubigne and Postel score. We have added the following sentences in the section Postoperative evaluation: “The Merle d’Aubigne and Postel score evaluates pain, gait and mobility, on a scale of 1 to 6 for each item, where 1 indicates the worst and 6, the best state of the patient. The total minimum score reached is 3, and the maximum is 18.”

Page 5 line 99: “The survival rates are the lowest reported in the published literature.” Do authors

mean "the lowest rate of conversion to total hip arthroplasty?

The sentence has been modified to “The survival rates based on conversion to THA are the lowest reported in the published literature.”

Page 6 line 139: " ---before it collapses and lead to hip joint degeneration." "lead" should be "leads".

We have performed the suggested correction.

Page 9 line 219: "---performed through the canal in order to evaluate the posterior aspect of the osteonecrosis (Figure 1)." why just posterior aspect of the osteonecrosis, but not other aspects? please explain.

Since the endoscopy was performed through a narrow (of 1 cm) canal and the hip joint was not invaded, the posterior aspect of the osteonecrosis was the only visible area. We have added the following sentence for clarity: “The posterior aspect of the osteonecrotic lesion was the only visible area, since the endoscopy was performed through a narrow canal.”

Page 11 line 290:"All patients apart from 1 had available 5-year follow up (Figures 3 and 4). One 38-year old patient with unilateral osteonecrosis of 3b stage due to leukaemia---" it is better to change to: "all patients except one were available for follow up for up to 5 years (Figures 3 and 4). One 38 year old patient with unilateral osteonecrosis of stage 3b due to leukaemia---"

We have performed the suggested change

Page 12 line 307: "---did not showed---" should be " did not show"

We have corrected the spelling

Page 13, line 347: "The most commonly performed treatment modality for osteonecrosis of the femoral head used in the past is free vascularized fibula grafting (FVFG)." I do not agree with this statement. The most common procedure for osteonecrosis is core decompression with or without bone graft. Therefore I suggest to change the sentence to "one treatment option for osteonecrosis of the femoral head is free vascularized fibula grafting.

We have performed the suggested change

Page 14 line 376: "At the same time is less stiff than the traditional tantalum," do authors mean: "At the same time porous tantalum is less stiff than the traditional tantalum,"?

We have proceeded to the suggested change.

Page 14 line 381-383: "Core decompression has been suggested that may be effective for preventing progression of osteonecrosis[29,30]. " correct grammar error.

We have revised the sentence.

Page 15 Line 396: "To our knowledge this the first time that such a combination was used in the published literature." Correct grammar error.

We have revised the sentence.

Line 404: "Porous tantalum implant appears to play a prominent role in femoral head osteonecrosis," role in treatment of osteonecrosis of the femoral head?

We have performed the suggested change

Line 419-423: "The limitations of the present study including the retrospective design, the sample size and the inhomogeneous group of eligible patients, the absence of control groups and the absence of long term survival outcomes exceeding 10 years should be considered in future study designs." correct grammar errors.

We have revised the sentence.

All figure legends are not adequately in details. the authors need to describe the figures in detail.

As suggested, we describe the figures in detail in the revised manuscript.

Figure 2 legend needs change "growth factors" to "bone marrow aspirates"

We have performed the suggested change

All changes have been highlighted in the text.

All authors have reviewed and approved the final version of the manuscript.

We thank you in advance for your consideration.

Yours sincerely,
Corresponding author