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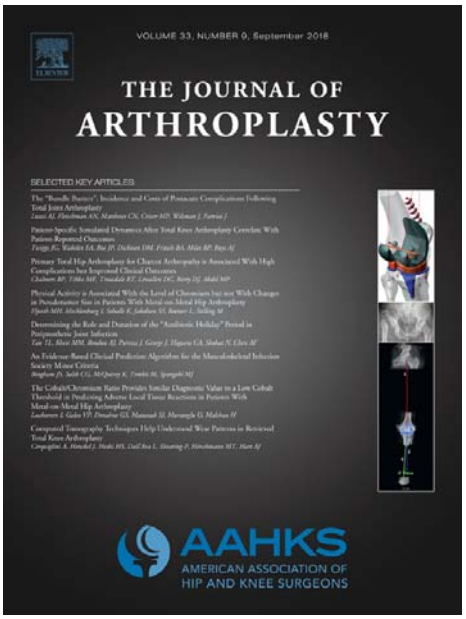
A Prospective randomized clinical trial in total Hip Arthroplasty - Comparing early results between the Direct Anterior Approach and the Posterior Approach



Cheng TE, Wallis JA, Taylor NF, Holden CT, Marks P, Smith CL, Armstrong MS, Singh PJ,

The Journal of Arthroplasty (2016), doi: 10.1016/j.arth.2016.08.027

Total hip arthroplasty is one of the most common surgeries performed in most centers. The numbers are increasing exponentially as better results set an

example to suffering patients. The patient demands have now moved on from pain-free hip to quicker recovery.

Direct anterior approach has its own advantages like an acceptable complication profile, early return to activities and lower dislocation rate. This study was conducted to compare the patient related outcomes between a direct anterior approach (DAA) and posterior approach (PA) as well as to compare objective physical function, health related quality of life, musculoskeletal impairments, radiological and clinical outcomes.

Study design: Prospective randomized study.

MATERIALS AND METHODS:

- *Study population*: 75 patients with unilateral osteoarthritis of hip, classified as Dorr A/B, BMI less than 35kg/m^2 and American society of Anesthesiologist score of less than 3. 37 hips were randomized into the DAA group and 38 hips into the PA group.
- *Implants:* R3 acetabular system and anthology femoral stem was used. Weight bearing surfaces was ceramic on ceramic (Biolox delta) or oxinium on polyethylene (Smith and Nephew).
- *Positioning and incision*: A traction table was used for the anterior approach. Incision was made 3cm posterior and distal to ASIS. The posterior approach was carried out with the patient in the lateral position and a 10-15cm incision was made over the greater trochanter.
- *Pain management:* 0.2% of Ropivacaine, 30mg Ketorolac and 1% adrenaline was infiltrated into the joint. Continuous infusion pumps were used in the ward post-operatively.
- *Rehabilitation:* All patients were mobilized immediately after surgery. Hip flexion and internal rotation was avoided in posterior approach as against direct anterior approach where no precaution was required.
- *Discharge*: All patients were discharged on the third post-operative day.

RESULTS

- 2 patients from DAA group were excluded from the surgery due to equipment failure and medical emergency causing cessation of surgery.
- 1 patient from the PA group had a periprosthetic fracture 4 weeks after the surgery.
- Longer operative times (P<0.001), smaller surgical wounds (P<0.001), higher blood loss(P=0.04) and lower analgesic usage in the first 2 weeks(p=0.04) was noted in the DAA group.

- No statistically significant difference between delayed Oxford Hip Scores (OHA) and Ontario McMasters Universities Osteoarthritis index (WOMAC) scores between the two groups.
- Stem had subsidence of more than 3mm in14% of DAA group as compared to 3% for the PA group at 6 weeks.

CONCLUSION

- No difference was noted in the primary outcomes.
- Secondary outcomes showed smaller surgical wound and lower analgesic usage in the DAA group.
- Analysis suggested that Western Ontario McMasters Universities Osteoarthritis index (WOMAC) and Oxford Hip Scores (OHS) were higher in the DAA group when hip flexion activities were taken into account.
- In contrast to theory which states that DAA which employs intermuscular and internervous plane to prevent muscle damage and weakness, this study showed weakness of straight leg raise in supine position until the 6 week mark.
- DAA technique has comparable results to PA THA.
- The authors prefer a posterior approach when anticipating a complex primary surgery.

Ref:

1. https://www.ncbi.nlm.nih.gov/pubmed/27687805

Intraosseous Regional Prophylaxis Provides Higher Tissue Concentrations in High BMI Patients in Total Knee Arthroplasty: A Randomized Trial

Authors

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DOI:10.1016/j.arth.2018.03.013

RELEVANCE OF THE STUDY:

- Obesity is a significant risk factor for the development and progression of osteoarthritis and periprosthetic joint infections, a perplexing situation for both patient and surgeon.
- In a recent meta-analysis, obesity was found to be associated with an odds ratio of 2.2 for superficial infections & 2.4 for deep infections.
- The risk of infection surges by 7% with per unit rise in BMI over a baseline of 35.
- A number of possible mechanisms are suggested which include, impaired microcirculation, lowered immune status & prolonged surgery.
- Intra-osseous regional administration of prophylactic antibiotics is reported to achieve concentration five-eight times more than systemic antibiotics in non-obese individuals. However, the pharmacokinetics differ for various drugs in obese individuals.
- Vancomycin has a higher volume of distribution and requires a total body weight based dosage when administered systemically to maintain target concentration. Furthermore, animal studies have demonstrated that a higher concentration is required for bone penetration.

- The authors conducted this study to evaluate & compare the tissue concentration of vancomycin, administered systemically (body weight based) to that of low dose given intraosseously in obese individuals undergoing total knee arthroplasty (TKA).

MATERIAL & METHODS:

Study Design: Prospective, randomized controlled trial.

- A total of 22 patients within 55-85-year age bracket with a BMI of >35 undergoing primary TKA for osteoarthritis knee were randomized by a computer into two groups.

- All the patients received Cefazolin 15mg/kg irrespective of randomization 15 minutes prior to tourniquet inflation.
- The intervention group (IORA), received vancomycin 500 mg in 150 mL normal saline delivered intraosseously through EZ-I0 cannula placed medially over the proximal tibia at the level of tibial tubercle just before making the skin incision (after inflation of tourniquet) for TKA.
- The control group (Systemic) received intravenous vancomycin 15 mg/kg body weight (maximum 2g) 1-2 hour prior to surgery.
- Tissue samples (subcutaneous fat & femoral cancellous bone) were taken at four points during surgery, first sample (subcutaneous fat only) immediately after skin incision, both fat & bone was taken then at the time of femoral cut, component trialling & prior to skin closure.
- The samples were stored at -80° until analysed for vancomycin concentrations using liquid chromatography& tandem mass spectrometry.

RESULTS:

- The mean concentration of vancomycin was found to be higher in IORA group compared to systemic group in both subcutaneous fat (39.3 µg/g Vs 4.4 µg/g $P < .001$)& bone samples (34.3 µg/g Vs 6.1 µg/g).
- In 12% of samples from systemic group the concentration of vancomycin was below 2 µg/g, the minimum inhibitory concentration for some strains of MRSA compared to 1% in IORA group.
- No significant association was found between bodyweight & fat or bone concentration of vancomycin.
- The mean plasma concentration of vancomycin was lower in IORA group (1.8 mg/ml) compared to systemic group (16.6 mg/ml).

CONCLUSION:

- This study concludes that a low-dose IORA is effective in the high-BMI patients undergoing TKA, reaching tissue concentrations of vancomycin 5-9 times higher than systemic administration.
- This was in spite of a low dose of 500 mg vancomycin in IORA group, compared with a weight-adjusted dose (15mg/kg) in systemic group, decreasing the risk of systemic adverse effects while achieving a higher tissue antibiotic concentration.

Ref:

1. https://linkinghub.elsevier.com/retrieve/pii/S0883-5403(18)30254-7

Posterolateral fusion (PLF) versus transforaminal lumbar interbody fusion (TLIF) for spondylolisthesis: a systematic review and meta-analysis

Spine J. 2018 Jun;18(6):1088-1098

AUTHORS:

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RELEVANCE OF THE STUDY:

- Lumbar fusion is an effective, standard and durable treatment for symptomatic lumbar spondylolisthesis.
- The addition of instrumentation to the procedure has shown to improve the chances of vertebral fusion.
- Despite the increase in the number of instrumented spinal fusions performed every year, the current literature provides insufficient evidence to recommend an optimal surgical fusion strategy– *a transforaminal inter-body fusion versus postero-lateral fusion*.
- The present study aims to compare the clinical outcomes, fusion rates, blood loss, and operative times between open posterolateral lumbar fusion (PLF) alone and open transforaminal lumbar interbody fusion (TLIF) + posterolateral fusion for spondylolisthesis.

MATERIAL AND METHODS

Study Design: Systematic review and meta-analysis of results

- A literature search of three electronic databases (PubMed, Cochrane Database of Systematic Reviews, and Web of Science) was performed to identify studies that have performed either PLF alone, or with PLF + TLIF for treatment of low-grade lumbar spondylolisthesis.

- The authors did not specify the type of spondylolisthesis whether it is lytic, degenerative or iatrogenic.
- Once studies matching the inclusion-exclusion criteria were identifies, the pooled data was analysed for multiple variables.
- The following variables were studied – fusion, infection rate, Oswestry Disability Index, operative time, blood loss and health related outcome scores.
- The summary effect size was assessed from pooling observational studies for each of the outcome variables, with odds ratios (ORs) used for fusion and infection rate, mean difference used for improvement in ODI and leg pain, operative time and blood loss, and standardized mean difference used for improvement in back pain and HRQOL outcomes.

RESULTS:

- The initial literature search yielded 282 English language studies.
- Seven studies were observed to meet the inclusion criteria and were included in the qualitative analysis. Five observational studies were included in the quantitative meta-analysis.
- The pooled fusion success rates were 84.7% (100/118) in the PLF group and 94.3% (116/123) in the TLIF group. Compared with TLIF patients, PLF patients had significantly lower odds of achieving solid arthrodesis.
- With regard to improvement in back pain, the point estimate for the effect size was −0.27 (p=.002), in favor of the TLIF group.
- For ODI, the pooled estimate for the effect size was −3.73 (p=.03), significantly in favor of the TLIF group.
- Operative times were significantly shorter in the PLF group, with a summary effect size of −25.55 (p<.01).
- No significant difference was observed in leg pain, HRQOL improvement, blood loss, or infection rate.
- The meta-analysis results of observational studies were consistent with RCTs, in favor of TLIF for achieving radiographic fusion and greater improvement in ODI and back pain.

CONCLUSIONS:

The study results indicate that

- For patients undergoing fusion for spondylolisthesis, TLIF is superior to PLF with regard to achieving radiographic fusion, improvements in back pain and functional outcomes (ODI).
- We need to note that the authors have included studies where PLF has been performed along with TLIF. A comparison between patients undergone only TLIF with those patients with PLF would be more appropriate.

LEVEL OF EVIDENCE: 1.

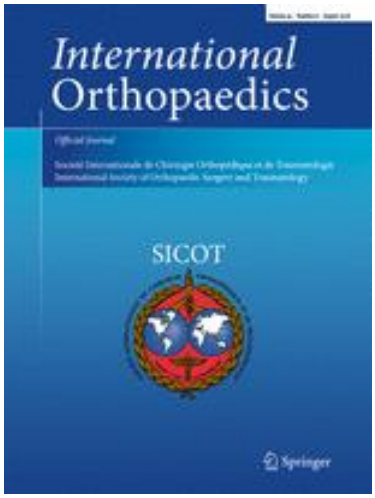
FUNDING: No funding was received for this study.

Ref:

1. https://linkinghub.elsevier.com/retrieve/pii/S1529-9430(18)30064-0

Inefficacy of autologous bone marrow concentrate in stage three Osteonecrosis: a randomized controlled double-blind trial

International orthopaedics 2017, 42 (7), 1429-1435.



AUTHORS:

Hauzeur, Jean-Philippe, Viviane De Maertelaer, Etienne Baudoux, Michel Malaise, Yves Beguin, and Valérie Gangji

Study conducted in in two university centers: Hôpital Erasme, Université de Bruxelles and CHU de Liège, University of Liège, Belgium.

RELEVANCE OF THE STUDY:

- Osteonecrosis of the femoral head (ONFH) is a challenging condition to treat and frequently leads to end stage arthritis requiring prosthetic replacement.
- There is high risk of multiple surgical procedures as patients with ONFH are frequently young and multiple sites involvement is common. Although its efficacy remains controversial, conservative approach via core decompression of the femoral head is the most widely procedure performed to treat ONFH.
- Studies have shown in early (unfractured) stages of ONFH, core decompression with implantation of autologous bone marrow aspirate concentrate (BMAC) was more effective than core decompression alone.
- Purpose of this study was to evaluate the effect of the addition of BMAC implanted in the necrotic lesion in comparison with core decompression alone in the evolution of ARCO stage 3 ONFH.

MATERIAL AND METHODS

Study Design: Prospective, double blinded, randomized placebo controlled trial

- 42 patients with aged 18 years or older suffering from ARCO stage 3 non-traumatic ONFH with a surface collapse lower than 30% of the entire articular surface together with a dome depression of no more than 4 mm were enrolled.
- 21 patients were randomly assigned to core decompression plus saline injection and 21 to core decompression plus BMAC implantation.

- Evaluation and follow-up were done at baseline, three, six, 12, and 24 months.

ASSESSMENT:

- The primary endpoint was the proportion of patients requiring THR.
- Secondary endpoints include clinical symptoms such as pain and functional ability and progression of the ON lesion as well as the appearance of osteoarthritic features (ARCO stage 4)

RESULTS:

There was no significant difference between the BMAC and placebo group in terms of:

- Rate of total hip arthroplasty
- Reduction in pain and functional score
- Rate of progression to ARCO stage 4
- Rate of progression in necrotic location, surface collapse and dome depression

No serious adverse events were recorded in either group.

CONCLUSION:

- Implantation of BMAC after core decompression did not produce any improvement of the evolution of ONFH stage 3

LEVEL OF EVIDENCE: 1

FUNDING:

The study was funded by Fund for Scientific Research of Belgium. No conflict of interest were disclosed.

Ref:

1. https://link.springer.com/article/10.1007/s00264-017-3650-8

No effectiveness of anticoagulants for thromboprophylaxis after non-major knee arthroscopy: a systemic review and meta-analysis of randomized controlled trials

Journal of Thrombosis and Thrombolysis. May 2018, Volume 45(4), 562–570

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DOI: https://doi.org/10.1007/s11239-018-1638-x

RELEVANCE OF THE STUDY:

- There has never been a consensus regarding thromboprophylaxis in arthroscopy.
- Recent literature has shown variable rates of thromboembolism following routine arthroscopic knee surgery; however, it is unknown if current practice reflects the literature.

- Eight randomized controlled trials were included this meta-analysis which compared rates of thromboembolism between thromboprophylaxis and control groups following knee arthroscopy.
- The overall rate of thrombotic complications was lower in thromboprophylaxis group compared to control group.
- However, when subgroup analysis was performed by dividing the knee arthroscopy group in to major (ligament reconstruction) and non-major (without ligament reconstruction) groups, rate of thrombotic complications did not significantly differ between thromboprophylaxis group and control group during non-major knee arthroscopy.

MATERIALS AND METHODS:

- **Study Design:** Meta-analysis/Systematic Review
- **Study Source:** Medline, Embase, Cochrane, The China National Knowledge Infrastructure, Wan Fang Chinese Periodical, and Google Scholar were searched using MeSH terms: 'venous', 'thrombosis', 'thromboembolism', 'thromboprophylaxis', 'knee arthroscopy' and 'randomized' for relevant articles published up to July 3, 2017. References for included articles were also searched for extended study.
- **Study Selection:** Study inclusion criteria: (1) randomized controlled trial study design (2) scheduled knee arthroscopy surgery (3) thromboprophylaxis with anti-platelet (e.g. Aspirin), low molecular weight heparin (e.g. Enoxaparin), factor Xa inhibitor (e.g. Rivaroxaban) or no thromboprophylaxis. A total of 8 studies (4148 patients) were included for the Meta-analysis/Systematic Review. Data collection was performed by two different authors and the discrepancy was resolved by a third independent reviewer.
- **Statistical analysis:** Risk ratios with 95% confidence intervals were calculated between the study and control groups as well as subgroups with the help of RevMan (Review Manager v5.0 developed by Cochrane Informatics & Knowledge Management).

RESULTS:

- The overall incidence of deep venous thrombosis (DVT) was significantly lower in thromboprophylaxis groups (39/2292) compared to no prophylaxis groups (82/1874) (8 studies; RR 0.21 [95%CI 0.07-0.64]; p=0.006).
- The overall incidence of symptomatic venous thromboembolism (VTE) was significantly lower in thromboprophylaxis groups (15/2274) compared to no prophylaxis groups (29/1856) (8 studies; RR 0.42 [95%CI 0.23-0.76]; p=0.004).
- The overall incidence of pulmonary embolism did not significantly differ between thromboprophylaxis groups (6/1897) and no prophylaxis groups (2/1443) (3 studies; RR 1.70 [95%CI 0.45-6.39]; p=0.43).

- The overall incidence of clinically relevant major bleeding did not significantly differ between thromboprophylaxis groups (13/2137) and no prophylaxis groups (10/1725) (5 studies; RR 1.11 [95%CI 0.48-2.56]; p=0.80).
- In non-major knee arthroscopies, the incidence of DVT did not significantly differ between thromboprophylaxis groups (9/1101) and no prophylaxis groups (26/1128) (5 studies; RR 0.34 [95%CI 0.09-1.23]; p=0.10).
- In non-major knee arthroscopies, the incidence of symptomatic VTE did not significantly differ between thromboprophylaxis groups (7/1035) and no prophylaxis groups (12/1024) (4 studies; RR 0.61 [95%CI 0.25-1.47]; p=0.27).

Limitations: Firstly, difference in anticoagulants, dosages, complexity of arthroscopy and follow-ups are all possible causes of heterogeneity. Secondly, difference in accuracy and sensitivity of venography and ultrasonography to detect DVT can also cause heterogeneity. Lastly, only two of the eight trials were adequate for blinding.

CONCLUSION:

- Thromboprophylaxis reduced the risk of deep venous thrombosis and symptomatic venous thromboembolism but did not significantly decrease the risk of pulmonary embolism or clinically relevant major bleeding after knee arthroscopy.
- There is no effectiveness of thromboprophylaxis for preventing DVT or symptomatic VTE in patients undergoing non-major knee arthroscopy.

Take home message: The result of this meta-analysis indicates that, although there is a role for routine thromboprophylaxis after knee arthroscopy, its role in knee arthroscopy not involving ligament reconstruction is very limited.

Level of evidence: Therapeutic **level I**

Funding declared by the authors: This study was supported by National Natural Science Foundation of China (Nos. 81501869, 81601983).

Conflict of interest declared by the authors: NO

Ref:https://link.springer.com/article/10.1007%2Fs11239-018-1638-x

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IMAGE QUIZ

Question: 7 year male with left lateral sided mild knee pain. No history of recent trauma or fever. Remote history of injection in the leg when he was treated for convulsions at age 2 years.

Options:

1. Brodies abscess
2. Bony physeal bar
3. Benign bone tumor
4. Blount's disease

Answer :

2. Bony physeal bar due to intra-osseous needle placement when treating convulsions. This caused varus and shortening of the tibia leading to overgrowth of the fibula head which was the site of his pain.