# Chemical Synovectomy with Rifampicin in Haemophilic Arthropathy

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## Introduction and Objective

Chemical synovectomy is one of the nonsurgical treatments, intra-articular injection of a certain materials, such as rifampicin, osmic acid, and other agents to control chronic hypertrophic synovitis and to reduce frequency of haemarthrosis in haemophilia. Intraarticular hemorrhage is the most frequent site of serious bleeding in haemophilic patients. Acute haemathrosis is usually unrelated to trauma and resolves after a short period, within 2 weeks. After haemarthrosis, the collected blood breakdown products act as potent stimulants to synovium inducing inflammation. Repeated bleedings stimulate synovial inflammation and progress to synovial hypertrophy and developing highly vascular synovium. In chronic synovitis stages, the vicious cycle make progressive joint degeneration and destruction. The primary aim of care is to prevent and treat bleeding with supplement deficient clotting factor. Synovectomy can be considered if chronic synovitis persists with frequent recurrent bleeding. Chemical or radiation synovectomies are indicated for recurrent haemarthrosis secondary to chronic synovitis which is not controlled by prophylaxis. Recently, non-surgical synovectomy is the procedure of choice and considered first.

From these perspectives, chemical synovectomy is already widely used in the treatment of chronic haemophilic synovitis. The aim of this study is to evaluate the effectiveness of chemical synovectomy using rifampicin in Korean haemophilic patients.

## Materials and methods

**Subjects**

From January 2012, we performed chemical synovectomy using rifampicin at 30 joints of 28 haemophilic patients with diagnosis of haemophilic arthropathy stage I-III (based on Fernandez-Palazzi clinical classification); 9 elbows, 9 knees, 12 ankles. Radiographic staging using Arnold- Hilgartner radiographic scale was also checked. All patients were males and mean age was 18.28 years (range, 5-40 years).

**Methods**

Patients were covered with anti haemophilic factor (AHF) concentrate up to 30% on the day of the injection to prevent the risk of bleeding complication. The dosage of rifampicin (Rifaldin®, Aventis Pharma, Madrid) used for knee was 500mg with 7-10ml normal saline (Figure 2a, 2b). Intra-articular injection of rifampicin was done every two weeks consecutively with total number of injections ranging from four to six. For elbow and ankle, the dosage of rifampicin was 250mg with 3-5ml normal saline. All the procedure was done under the ultrasonography guidance. During follow-up, both clinical assessment including bleeding frequency, pain, joint physical status and radiological staging were evaluated as parts of WFH scoring system. Physical status evaluation includes swelling, muscle atrophy, axial deformity, range of motion, etc. WFH pain score describes patient's subjective joint pain as follows: grade 0 (no pain) to grade 3 (severe). Patients were asked to score their satisfaction on a scale 1 (not satisfied) to 10 (completely satisfied). Overall outcome was derived from post-injection functional status and clinical features, according to the following scale; excellent, good, fair, and poor.

**Analysis**

Statistical analysis was performed using SPSS software, version 17.0(SPSS Inc., Chicago, IL, USA). Paired sample t-test was used to compare pre- and post-chemical synovectomy means of the evaluated parameters. Data are reported as means ± SD or proportions as appropriate. Significance was defined as a p value < 0.05.

## Result

According to the WFH system, mean frequency of haemarthrosis was reduced from 2.02±0.76 per month to 0.3±0.43 per month (P<0.01). The changes of mean frequency at each different joint were as follows in Fig. 3. The mean pain score decreased from 2.13±0.63 to 0.67±0.71 (P<0.01) (Fig. 4). The mean subjective satisfaction score improved from 2.5±1.04 to 7.23±1.55 (P<0.01) (Fig. 5). The WFH orthopedic joint score was reduced from 5.6±2.60 to 3.5±3.13 significantly (P<0.01) (Fig. 6). Improvements in different parts of the WFH joint physical score were seen for swelling, crepitus, range of motion (Fig. 7). However, only the changes in swelling and crepitus were statistically significant. There were no changes in muscle atrophy, and instability. After treatment, the radiographic stage was unchanged in most joints (P>0.05) (Table 1). Overall, we achieved excellent outcome in 15(50%) of the joints and good in 13 (43.33%). And only 2 (6.67%) of the joint with fair was obtained (Table 2).

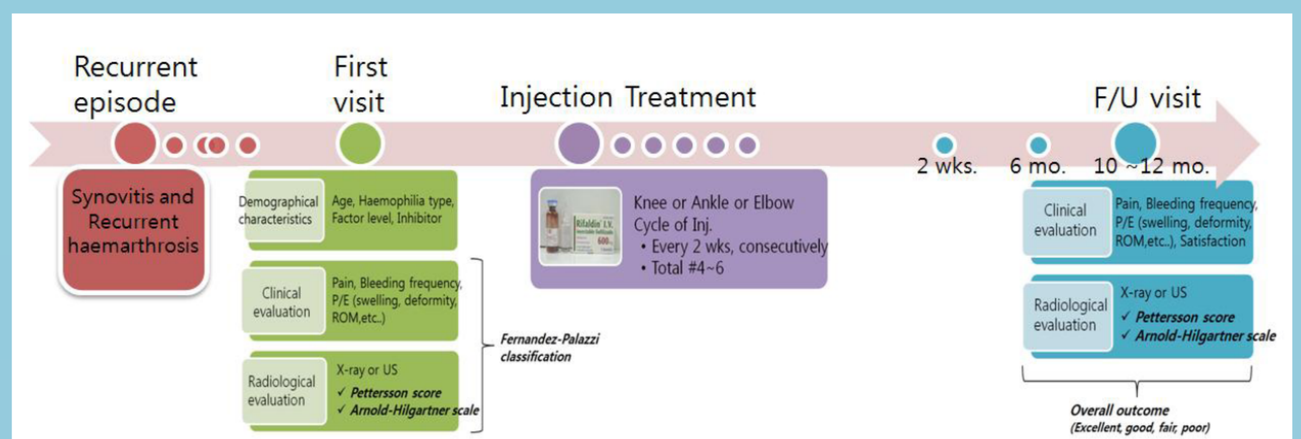
## Discussion and Conclusion

Our experience showed the chemical synovectomy using rifampicin appeared to be effective in stabilizing chronic haemophilic arthropathy. From the clinical standpoint, bleeding frequency, pain, subjective symptom, and physical findings of joint including swelling were improved. Key to successful prevention of haemophilic arthropathy is aggressive management of initial hamarthrosis, before the development of chronic synovitis The vicious cycle of haemarthrosis – synovitis – hemarthrosis make the joint problem worse.

In this study, chemical synovectomy at intervals of 2 weeks using rifampicin showed satisfactory outcome. The reason of injection every 2 weeks instead of 1 week interval tried previous studies is pain on injection. The pan induce Immobilization, disuse, and problems in school attendance or working place if we inject every week. We tried to regain or maintain joint function after short term immobilization or inactive, painful period.

Compared to previously reported literature, our findings reapproved that chemical synovectomy using rifampicin is a cost-effective, simple, and practical method in the management of haemophilic arthropathy. However, the protocols we used, especially 2 weeks interval injection protocol should be evaluated further.

Figure 1. Summary of methods from recruiting of participants, joint evaluation, and schedule of injection to follow up of treated joint



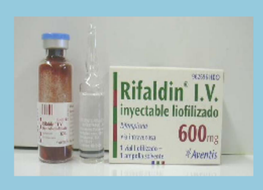




Figure 2a. Injection pharmaceuticals ; Rifampicin (Rifaldin®, Aventis Pharma, Madrid)

Figure 2b. Rifampicin preparation via 5cc syringe and 25G needle

Figure 3. Mean frequency of haemarthrosis before and after treatment

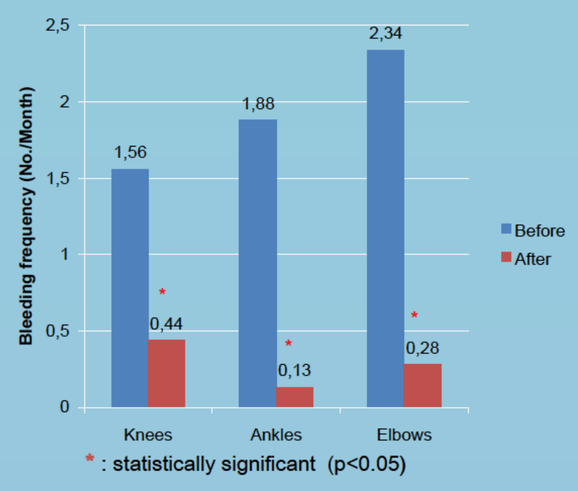
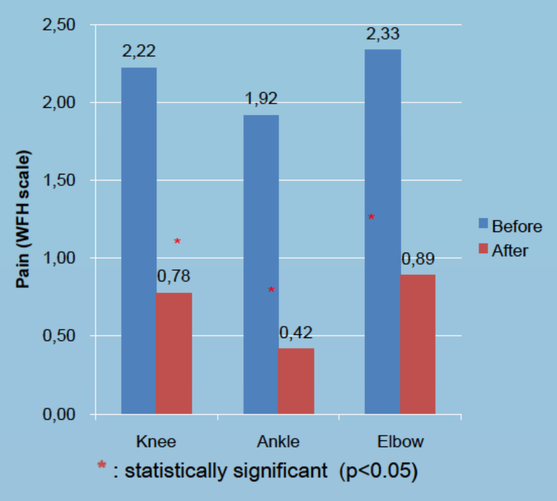



Figure 4. Pain score (WFH scale) of haemarthrosis before and after treatment

Figure 5. Mean subjective satisfaction score of haemarthrosis before and after treatment



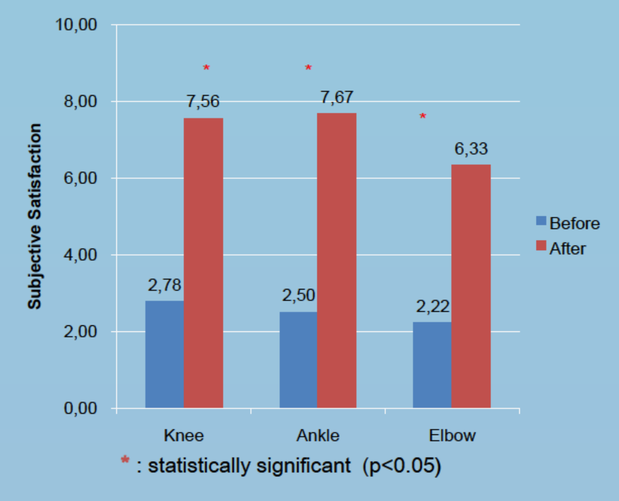
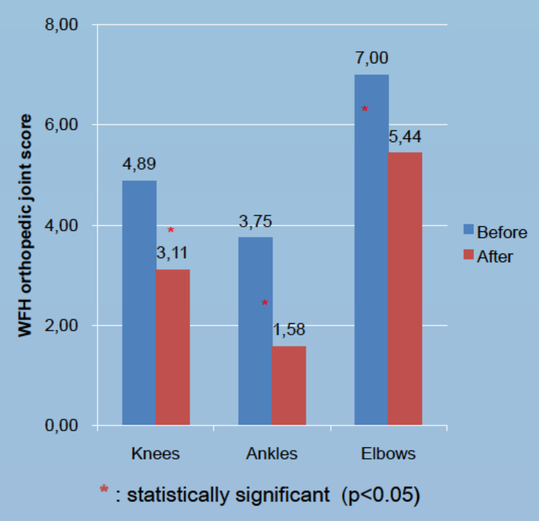




Figure 6. Mean joint physical score (WFH scale) of haemarthrosis before and after treatment

Figure 7. Changes in the mean score of different parts of the WFH joint physical score of haemarthrosis before and after treatment



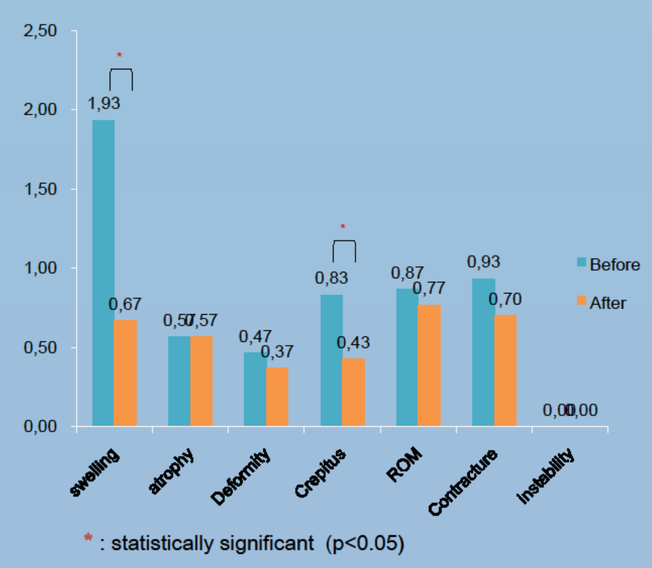




Table 1. Changes of radiographic staging (using Arnold- Hilgartner scale and Pettersson score) before and after treatment in each different joints

| | Score (mean± SD) | | | |
|---|---|---|---|---|
| | Knee | Elbow | Ankle | Total |
| **Pettersson Score** | | | | |
| Before | 2.78±2.44 | 6.00±3.20 | 3.17±2.44 | 3.90±2.95 |
| After | 2.78±2.44 | 6.22±3.45 | 3.50±2.58 | 4.10±3.09 |
| **Arnold-Hilgartner Scale** | | | | |
| Before | 2.44±1.01 | 3.56±1.16 | 2.79±1.03 | 2.92±1.12 |
| After | 2.44±1.01 | 3.61±1.20 | 2.83±1.07 | 2.95±1.15 |

Table 2. Overall outcome after treatment in each different joints

| | Gradings | | | |
|---|---|---|---|---|
| | Knees | Ankles | Elbows | Total(%) |
| Excellent | 6 | 8 | 1 | 15 (50%) |
| Good | 3 | 4 | 6 | 13 (43.33%) |
| Fair | 0 | 0 | 2 | 2 (6.67%) |
| Poor | 0 | 0 | 0 | 0 (0%) |
| Total | 9 | 12 | 9 | 30 |