# EFFICACY AND SAFETY OF BEMIPARIN AS ANTICOAGULANT IN BOTH HEMODIALYSIS AND ON-LINE HEMODIAFILTRATION (OL-HDF): A PROPOSAL OF DOSE RECOMMENDATION

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## INTRODUCTION

- Low-molecular-weight heparin (LMWH) is recommended as hemodialysis anticoagulation in the European Best Practice Guidelines [1].
- LMWH doses are defined according to the patient weight for each manufacturer but reduced doses are more frequently used according to clotting of the extracorporeal circuit.
- There is not available data of factor Xa inhibition during or after hemodialysis treatment for each LMWH. Moreover, differences of formulation determine varying clearance for nonstandard hemodialysis (HD) schedules such as on-line hemodiaflitration (OL-HDF).

## OBJETIVE

- To study the efficacy and safety of bemiparin as anticoagulant in HD and OL-HDF monitoring anti-Xa activity during and after both modalities of dialysis. Also, It was defined a proposal of dose recommendation.

## METHODS

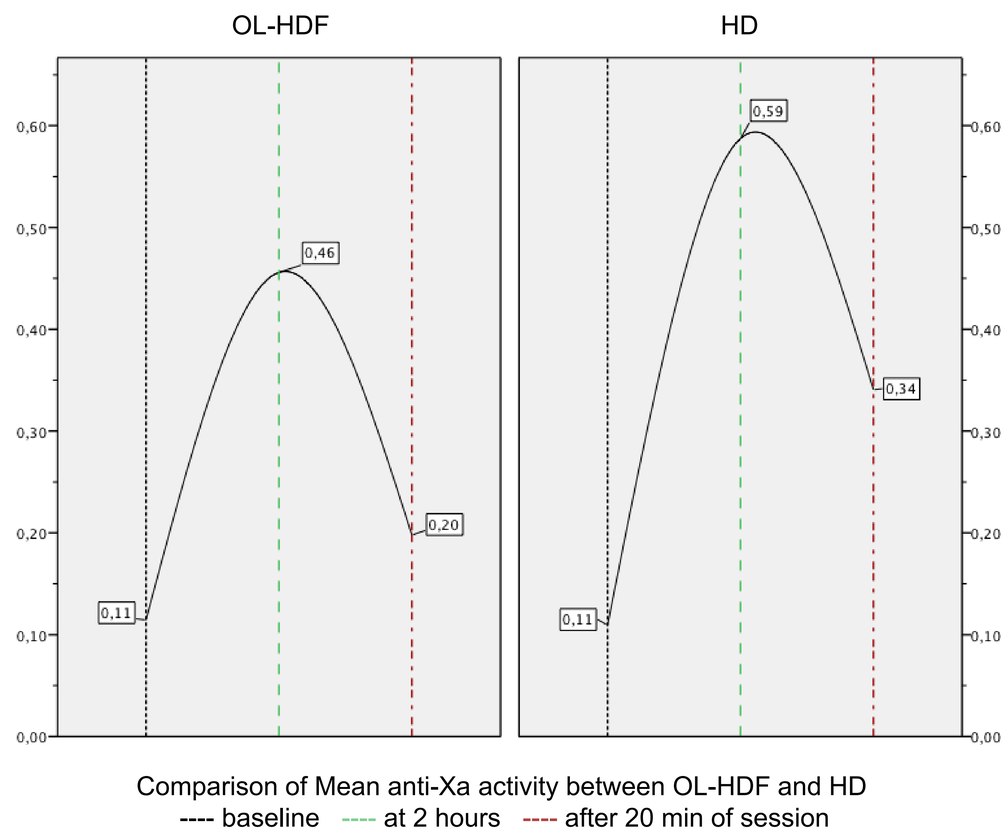
- Observational and retrospective study.
- Conducted in chronic hemodialysis patients of our unit HD who received a single bolus dose of bemiparin at the start of a dialysis.
- Doses had been defined according to clotting parameters of circuit.
- Measurements of anti-Xa activity were collected before start dialysis, 2 hours after beginning dialysis and at 20 min after finishing dialysis.
- The objective value of anti-Xa activity was >0.4 UI/ml during HD and less than 0.4 UI/ml after finishing dialysis (this level discarded anticoagulant effect).
- Data were registered from the midweek dialysis.
- Descriptive statistics and non parametric test (chi-square test and U-Mann Withney) were used (SPSS v22).

## RESULTS

- Thirty nine chronic hemodialysis patients (19 males, 66 years old SD: 15.9; 20 females, 64 years old SD: 15.3) were included.
- From the total population, 15 patients (38.5%) were in HD and 24 patients (61.5%) in OL-HDF.
- Data of the vascular access (native arteriovenous fistule or graft/catheter) are the followings: 5/10 patients in HD and 19/5 patients in OL-HDF ($p<0.01$).
- There were no significant differences ($p>0.05$) between HD and OL-HDF for the values of anti-Xa activity at the baseline time (HD vs OL-HDF): 0.11±0.07 vs 0.11±0.06 UI/ml. However there was statistical significance after 2 hours of starting dialysis 0.59±0.25 vs 0.46±0.38 UI/ml ($p<0.05$) and after 20 min of finishing dialysis session 0.34 ±0.14 vs 0.20 ±0.12 UI/ml ($p<0.01$).
- The mean convection volume exchange with online hemodiafiltration was 24.19 L (SD: 4.08)
- Other comparisons between both treatment groups of variables related directly or indirectly with the efficacy of hemodialysis anticoagulation are shown in the Table 1*. The graphic represents the comparison of the mean anti-Xa activity between OL-HDF and HD.

| | Unit HD n=39 | | HD n=15 | | OL-HDF n=24 | | |
|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | Mean | SD | p |
| Bemiparin (UI/Kg) | 50.7 | 6.4 | 48.1 | 6.8 | 52.3 | 5.7 | ns |
| Anti-Xa (120 min) | 0.51 | 0.34 | 0.59 | 0.25 | 0.46 | 0.38 | <0.05 |
| Anti-Xa (after HD session) | 0.25 | 0.15 | 0.34 | 0.14 | 0.20 | 0.12 | <0.01 |
| | | | | | | | |
| Charlson Comorbidity Index | 5.46 | 2.0 | 5.8 | 2.1 | 5.2 | 1.9 | ns |
| Time in HD (months) | 42.8 | 46.1 | 21.2 | 29.4 | 56.3 | 49.9 | <0.05 |
| | | | | | | | |
| Qb (mL/min) | 385.8 | 33.8 | 376.2 | 41.7 | 391.8 | 27.1 | ns |
| TMP (mmHg) | 133.5 | 74.4 | 60.6 | 48.4 | 179.1 | 45.6 | <0.01 |
| Length of HD session (min) | 244.1 | 26.6 | 245.3 | 18.3 | 243.3 | 31.0 | ns |
| Kt (L) | 53.3 | 11.9 | 49.5 | 11.1 | 55.8 | 11.9 | ns |
| | | | | | | | |
| Hemoglobin (g/dL) | 10.9 | 1.0 | 11.0 | 0.9 | 10.9 | 1.1 | ns |
| Hematocrit (%) | 33.2 | 3.5 | 33.6 | 3.3 | 33.0 | 3.7 | ns |
| Leukocytes (10E9/L) | 6.0 | 1.5 | 6.0 | 1.8 | 6.1 | 1.4 | ns |
| Platelets (10E9/L) | 174.6 | 54.2 | 165.2 | 60.0 | 180.5 | 50.7 | ns |
| C-reactive protein (mg/dL) | 0.5 | 0.5 | 0.6 | 0.6 | 0.4 | 0.4 | ns |
| Serum albumin (mg/dL) | 3793.8 | 333.1 | 3826.0 | 356.9 | 3773.7 | 323.6 | ns |
| Ferritin (ng/mL) | 260.1 | 216.8 | 280.3 | 225.7 | 247.5 | 215.0 | ns |

*Data expressed as SD: Standard Deviation; ns: non significant; p: p-value;
Qb: blood flow rate ; TMP: transmembrane pressure




Comparison of Mean anti-Xa activity between OL-HDF and HD
---- baseline ---- at 2 hours ---- after 20 min of session

## CONCLUSIONS

Bemiparin is effective and secure for preventing clotting the circuit of hemodialysis in both therapy, conventional HD and OL-HDF. A mean dose of 50 UI/kg at the start of a dialysis could be proposed for HD and an increase of 10% of this dose could be proposed for OL-HDF. Both doses are similar to recommended doses for the manufacture as prophylactic antithrombotic therapy.

## REFERENCES

1.European Best Practice Guidelines. V1-V5. Haemodialysis and prevention of system clotting (V1-V2); prevention of clotting in the haemodialysis patients with elevated bleeding risk (V3); heparin induced thrombocytopenia (V4); and side effects of heparin (V5). Nephrol. Dial. Transplant. 2002; 17 (Suppl 7): 63

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