

# Correlation between Ultrasonographic Score and Clinical Variables in Hemophilic Knee and Ankle Arthropathy

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## Introduction

In severe haemophilia A patients, more than 80% of the spontaneous bleeding events occurring in the joints and muscles. Repeated joint bleeding leads to chronic synovitis, cartilage damage and bony destruction, which results in reduced range of motion (ROM), painful joints and muscle atrophy. Hemophilic arthropathy can negatively influence perception of health-related quality of life in hemophilia patients. The aim of the study was to assess the correlation between ultrasonographic (USG) score and clinical evaluations in hemophilic knee and ankle arthropathy

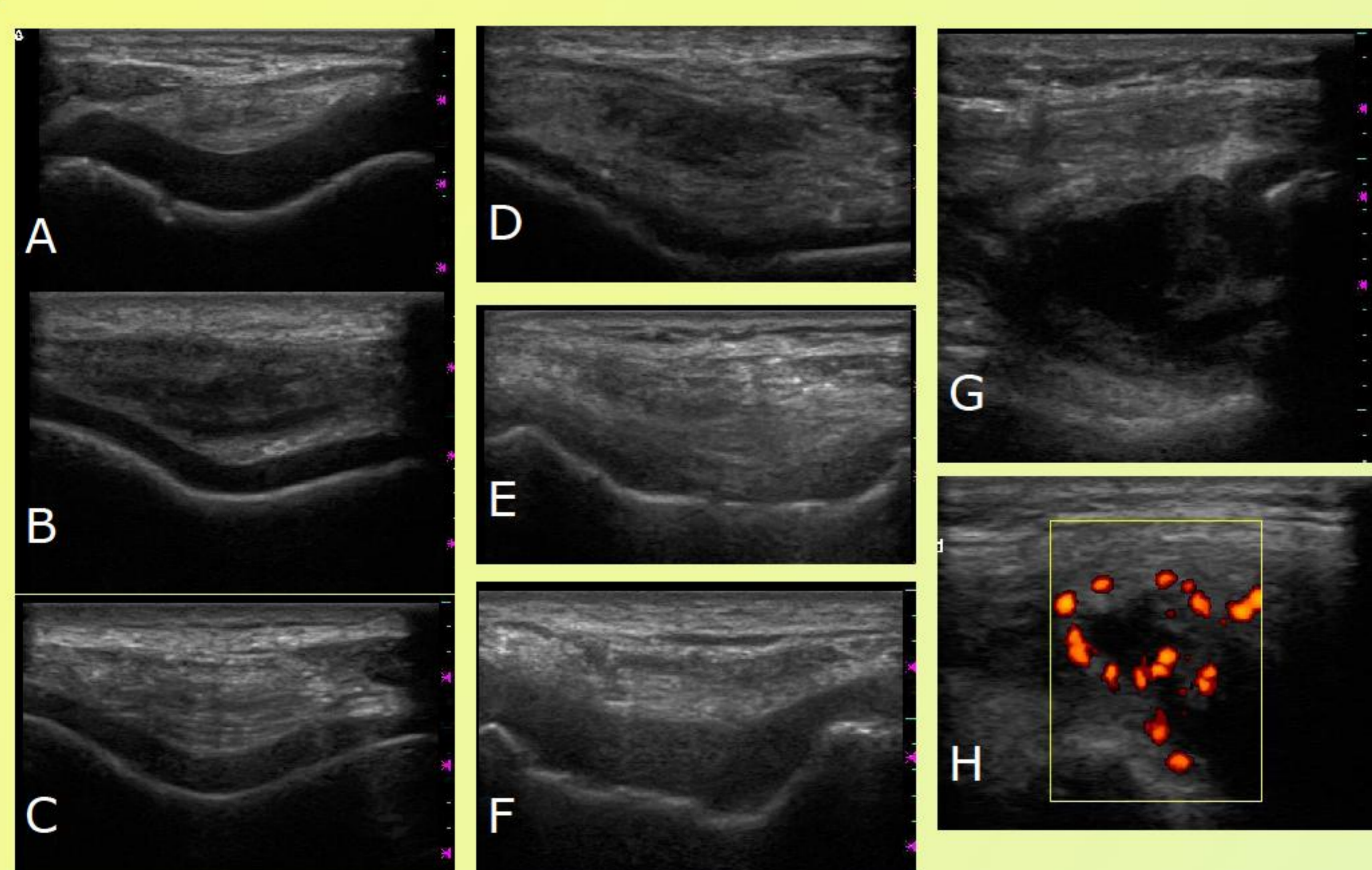
## Materials and methods

A total of 56 hemophilic patients who had been followed at our hemophilia center without major knee or ankle surgery were studied. We collected clinical information including age, hemophilia type, disease severity, factor inhibitor and SF-36. Bilateral knees and ankles were evaluated in terms of range of motion (ROM), visual analogue pain scale (VAS), Pettersson score by X-ray and USG score by ultrasound on the same day. Correlations were assessed by the Spearman's correlation coefficient.

## Results

Fifty-five hemophilia A and 1 hemophilia B patients were enrolled. The mean age was  $29.59 \pm 14.1$  years (range, 18 to 63 years). The USG abnormalities were found in 86/112 ankles (76.8%) and 69/112 knees (61.6%). As determined by X-ray evaluations, 61/112 ankles (54.5%) and 44/112 knees (39.3%) had hemophilic arthropathy. There was a strong correlation between USG score and Pettersson score ( $r=0.894$ ,  $p<0.001$ ). Significant correlations were also noted between USG score and age ( $r=0.684$ ,  $p<0.001$ ), hemophilia severity ( $r=0.351$ ,  $p=0.008$ ), ROM ( $r=-0.862$ ,  $p<0.001$ ), VAS ( $r=0.502$ ,  $p<0.01$ ), SF-36 ( $r=-0.430$ ,  $p=0.001$ ).

**Fig. 1 Ultrasonography of knee joint in hemophilic patients**



- (A) Intercondylar cartilage of knee joint (5-year-old hemophilia A boy)
- (B) Normal intercondylar cartilage of knee joint (adult)
- (C) Increased echogenicity of intercondylar cartilage
- (D) Decreased thickness of intercondylar cartilage
- (E) Irregularity of intercondylar subchondral bone
- (F) Hypertrophic synovium in intercondylar region
- (G) Hypertrophic synovium in supra-patellar recess
- (H) Hypervascularity of synovium in supra-patellar recess

## Conclusion

Our findings suggest that USG is a useful tool to evaluate hemophilic knee and ankle arthropathy and even detected abnormalities in the joints that radiography shows normal. USG score correlates with many clinical variables of hemophilic knee and ankle arthropathy. We believe that USG score is an optimal assessment for early detection and follow-up monitoring of hemophilic arthropathy

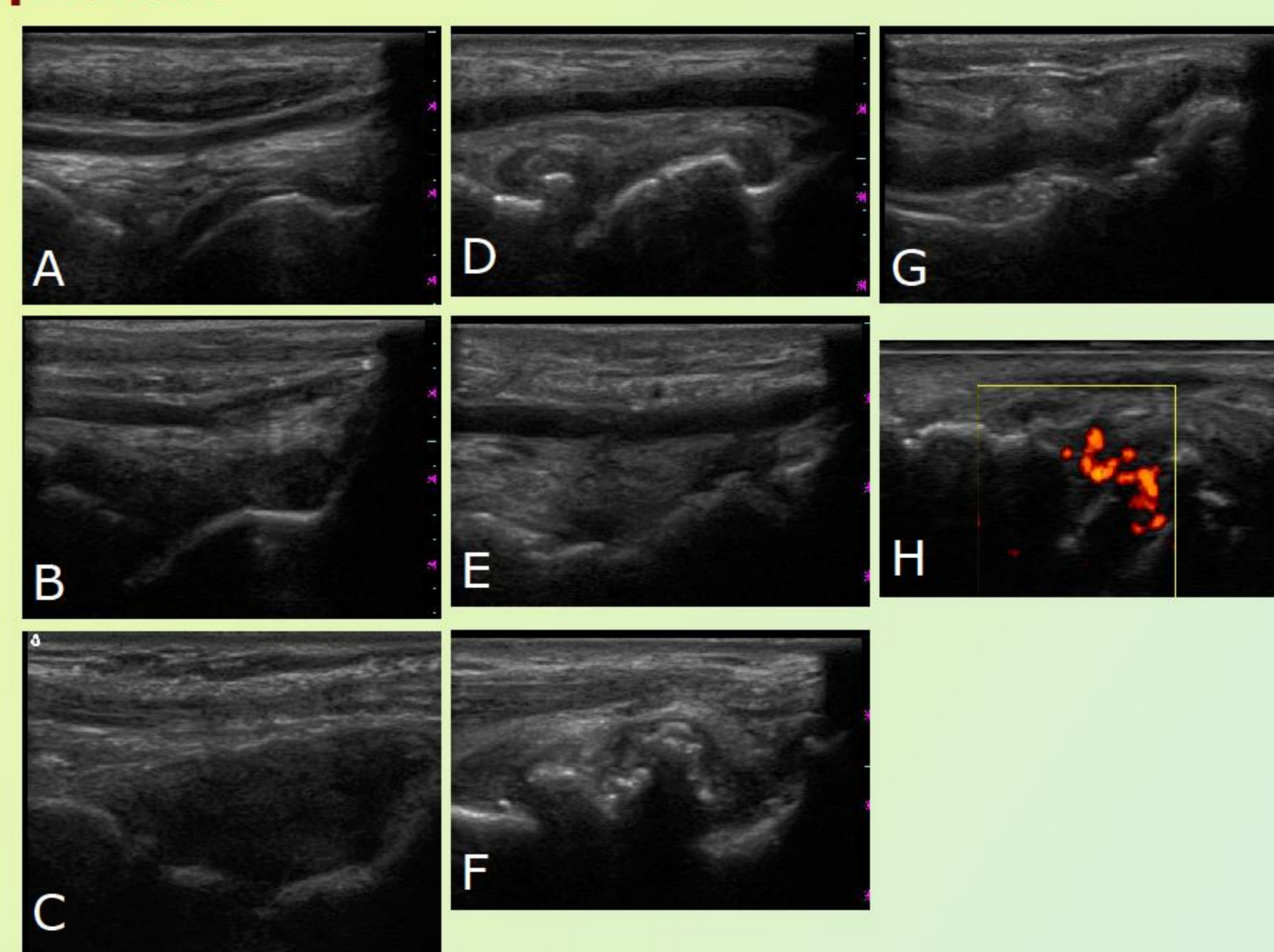
**Tab. 1 Demographic characteristics of 56 hemophilic patients**

| Characteristic           | Average    | Range     |
|--------------------------|------------|-----------|
| Age, y/o,                | 29.59±14.1 | 18-63     |
| BMI (kg/m <sup>2</sup> ) | 22.65±5.0  | 19.1-40.3 |
| Severity                 |            |           |
| A, severe                | 40         |           |
| A, moderate              | 9          |           |
| A, mild                  | 6          |           |
| B, severe                | 1          |           |
| Inhibitor                | 2          |           |

**Tab. 2 USG and radiographic abnormalities**

| Abnormal          | Rt knee  | Lt knee  | Rt ankle | Lt ankle | Total     |
|-------------------|----------|----------|----------|----------|-----------|
| <b>X-ray</b>      | 20 (36%) | 24 (43%) | 29 (52%) | 32 (57%) | 105 (47%) |
| <b>USG</b>        | 35 (63%) | 34 (61%) | 43 (77%) | 43 (77%) | 155 (69%) |
| Cartilage         | 35 (63%) | 33 (59%) | 43 (77%) | 42 (75%) | 153 (68%) |
| Synovium          | 25 (45%) | 29 (52%) | 32 (57%) | 31 (55%) | 117 (52%) |
| Bony irregularity | 20 (36%) | 25 (45%) | 31 (55%) | 34 (61%) | 110 (49%) |
| X-ray (-)         | 16 (29%) | 11 (21%) | 16 (29%) | 18 (32%) | 61 (27%)  |
| USG (+)           | 1 (2%)   | 1 (2%)   | 1 (2%)   | 1 (2%)   | 4 (2%)    |
| X-ray (+)         |          |          |          |          |           |
| USG (-)           |          |          |          |          |           |

**Fig. 2 Ultrasonography of ankle joint in hemophilic patients**



- (A) Normal anterior recess cartilage of ankle joint
- (B) Hypertrophic synovium in ankle joint
- (C) Marked hypertrophic synovium in ankle joint
- (D) Osteophyte in anterior recess of ankle joint
- (E) Irregularity of intercondylar subchondral bone
- (F) Marked osteophyte with joint space narrowing in ankle joint
- (G) Fusion of ankle joint
- (H) Hypervascularity of synovium in anterior recess of ankle joint

