SUMMARY AND CONCLUSION

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Juvenile rheumatoid arthritis (JRA) is a common chronic illness of childhood *(Mason et al., 2005).*

The damage to the cartilaginous tissue is often irreversible and responsible for much of the morbidity. Timely diagnosis and appropriate aggressive treatment of patients improve quality of life and outcome *(Mine et al., 2006).*

The aim of this work was to study the ultrasonographic(USG) features of the knee and hip joints as a model of superficial and deep synovial joints in relation to the clinical and laboratory measures of the JRA patients and also to evaluate the accuracy of US in diagnosis of local joint activity.

This study included 20 patients with JRA fulfilling the diagnostic criteria of JRA by *Cassidy et al. (1986).* Twenty apparently healthy normal children, age and sex matched to our patients ,were also included as a control group.

All patients were subjected to full history taking, careful clinical examination and laboratory investigation

The knee and hip joints of all patients and controls were examined with plain radiography and ultrasonography at the same day of clinical examination using an US device with 1.5 MHZ transducer to detect knee synovial thickeness and effusion as well as synovial joint space(SJS) width of the hip joint according to standardized sonographic procedures of knee and hip joint examination.

The results of this study were tabulated, graphed and statistically analyzed.

The results showed the following:

- Eleven patients (55%) were females and 9 patients (45%) were male. Their ages ranged between 4-16 years (mean ± SD 9.2 ± 3.9 years),

- Their disease duration ranged between 7 – 120 months with a mean of 39.1 ± 32.4 month. Eight patients (40%) had polyarticular onset JRA, 7 patients (35%) had pauciarticular onset while 5 patients (25%) had systemic onset JRA.

- The mean value of AI score of was 16.4 ± 10.6, the mean VAS of was 5.1 ± 1.9 and the mean DAS score was 4.0 ± 1.1.

- Regarding the functional capacity grading *(Steinbrocker et al., 1949)*. Eight patients (40%) were grade I, 8 patients (40%) were grade II while 4 patients (20%) were grade III.

- The mean JAFAR score was 8.4 ± 4.4.

- The mean clinical knee score was 2.7 ± 2.5 and the mean clinical hip score was 0.7 ± 1.6.

- The mean hemoglobin concentration was 10.0 ± 1.4 gm/dl, the mean ESR level was 47.2 ± 17.5mm/1st hour while the mean CRP level was 29.2 ± 20.9 mg/l.

-Five patients (25%) had a positive rheumatoid factor while 15 patients (75%) had rheumatoid factor negative .

- The mean USG knee synovial thickness was 4.2 ± 2.4 mm in the JRA patients compared to a mean of 1.7 ± 0.3 mm in the control group. A highly statistically significant difference (P < 0.001) was observed between both groups-

-Although knee effusion was not detected by US in any of the control subjects, it was demonstrated in 90% of our patients with amean effusion volume of 3.8 ± 3.1 cc

- The mean USG hip SJS width was 4.6 ± 2.7 mm in the JRA patients compared to a mean of 3.9 ± 0.9 mm in the control group.

- There was statistically insignificant difference ($P > 0.05$) between both groups .

-There was a highly statistically significant difference($P > 0.001$)between the clinically active and the clinically inactive knees as regard the USG knee synovial thickness

- The mean USG hip SJS width was significantly higher ($P > 0.001$) in the clinically active than in the clinically inactive hips

- The mean USG knee effusion volume was statistically higher ($P < 0.05$) in the clinically active than the clinically in active knees

- As regard the disease duration, AI score, VAS , DAS score, clinical knee score, clinical hip score and JAFAR score there were statistically insignificant difference($P<0.05$) among the polyarticular, pauciarticular and systemic onset JRA patients

- There was a statistically significant difference ($P < 0.05$) among the different disease onset types as regard the USG knee effusion volume being greatest in the systemic onset type (mean $\pm$ SD 6.7 ± 5.1 cc) and lowest in the pauciarticular onset type (mean $\pm$ SD 2.4 ± 1.2 cc),

- There was a statistically insignificant difference ($P > 0.05$) among the different disease onset types as regard the USG knee synovial thickness and the USG hip SJS width

- There were statistically insignificant differences($P>0.05$).between patients with a seronegative and those with a seropositive disease as regard disease duration, AI score, VAS , DAS score, clinical knee

score, clinical hip score, JAFAR score, HB level, ESR level ,CRP level, USG knee synvial thickness and USG knee effusion volume

- USG hip SJS width was statistically significantly higher (P<0.05) in seropositive patients than seronegative disease

- Highly statistically significant differences (P < 0.001) were found among the patients with a low, moderate and high activity as regard CRP and ESR levels being highest in those with a high disease activity

- Statistically significant differences(P < 0.05) were found among the patients as regard AI score and JAFAR score being highest in patients with a high disease activity

- Patients with a high disease activity had a statistically lower hemoglobin level (P < 0.05).

- There were statistically insignificant differences (P > 0.05) among the patients according to their disease activity.regarding disease duration, VAS , clinical knee score and clinical hip score

- Patients with a high disease activity had a statistically higher (P <0.05) USG knee synovial thickness and knee effusion volume than patients with a low and moderate disease activity

- Patients with functional capacity grade III had a statistically higher disease duration (P < 0.001) and JAFAR score (P < 0.05) than those patients with grade I and grade II .

- There were statistically insignificant differences (P> 0.05) among the patient with grade I, II and III as regard AI score, VAS , DAS score, clinical knee score, clinical hip score, hemoglobin , ESR andCRP levels, USG knee synovial thickness, USG knee effusion volume and USG hip SJS width.

- Significant positive correlations(P < 0.05) were found between USG knee synovial thickness values and AI scores, DASs , clinical knee

scores, ESR levels and CRP levels while insignificant correlations were found regarding disease durations, VASs, JAFAR scores, clinical hip scores and hemoglobin levels .

- Significant positive correlations($P < 0.05$) were found between USG knee effusion volumes and AI scores , VASs, DASs, clinical knee scores, ESR levels and CRP levels

- Significant negative correlations ($P < 0.05$) were found between USG knee effusion volumes and hemoglobin levels while insignificant correlations ($P > 0.05$) were found with disease durations and clinical hip scores

- Concerning USG hip SJS width, there were significant positive correlations($P < 0.05$) with DAS scores, clinical hip scores and ESR levels and insignificant correlations ($P > 0.05$)with disease durations, AI scores, VASs, JAFAR scores, clinical knee scores, hemoglobin levels and CRP levels

- Twenty five knees out of 26 clinically active knees showed pathological USG synovial thickness.

- Seven clinically inactive knees showed USG pathological synovial thickness.

- Two knees of the control showed USG pathological synovial thickness. These results yielded a sensitivity 82.5%, a specificity 95%, aPPV 94.3% and a NPV 84.4% for the USG synovial thickness

- Five hips out of 7 clinically active hips showed pathological SJS widening. Six hips which were apparently inactive showed USG pathological SJS widening and six hips of the control subjects showed USG pathological SJS widening. These results yielded a sensitivity 32.5%, a specificity 85%, PPV% 68.4% and a NPV 55.7%. for the USG hip SJS width.

CONCLUSIONS

In the light of our results we can conclude that:

- The quantitative assessment of both synovial effusion and synoival thickness using US in JRA have a useful role in supporting clinical data of disease activity especially in mild forms (subclinical synovitis), even if differentiation between active and quiescent disease is often possible on clinical ground.

- US detected parameters represent a reliable index of JRA disease activity with a higher sensitivity to USG knee synovial thickness and a higher specificity for USG knee effusion. This was not much realized with the hip SJS width.

- Ultrasonography is a simple, valuable, non invasive tool in evaluating the knee and hip joint involvement in JRA patients.

RECOMMENDATION

A prospective study is recommended to assess wheather the USG finding could be predictive for early relapse in order to treat a silent joint as long as diagnosis and therapy is routinely established on a clinical basis.