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CORRELATION OF ULTRASOUND AND CLINICAL INDICATORS IN HAND JOINT PATHOLOGY

Abstract

Hand joint pathology is a common clinical problem in inflammatory, degenerative, and metabolic diseases, often leading to pain, stiffness, and functional impairment. Clinical assessment alone may underestimate early or subclinical structural changes. Musculoskeletal ultrasound (US) has emerged as a sensitive imaging modality capable of visualizing synovial, cartilaginous, and periarticular abnormalities. This study analyzes the correlation between ultrasound findings and clinical indicators in patients with hand joint pathology, highlighting the diagnostic and prognostic value of integrated clinical–ultrasound assessment.

Keywords: musculoskeletal ultrasound; hand joint pathology; synovitis; power Doppler ultrasound; clinical assessment; pain severity; functional impairment; inflammatory arthritis; osteoarthritis of the hand; imaging–clinical correlation.

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QO‘L BO‘G‘IMLARI PATOLOGIYASIDA ULTRATOVUSH VA KLINIK KO‘RSATKICHLARNING O‘ZARO BOG‘LIQLIGI

Abstrakt

Qo‘l bo‘g‘imlari patologiyasi yallig‘lanish, degenerativ va metabolik kasalliklarda keng tarqalgan klinik muammo bo‘lib, ko‘pincha og‘riq, qattiqlik va funksional buzilishlarga olib keladi. Klinik baholashning o‘zi erta yoki subklinik strukturaviy o‘zgarishlarni yetarlicha baholamasligi mumkin. Tayanch-harakat ultratovush tekshiruvi (UTT) sinovial, tog‘ay va periartikulyar anomaliyalarni vizualizatsiya qilishga qodir bo‘lgan sezgir tasvirlash usuli sifatida paydo bo‘ldi. Ushbu tadqiqotda qo‘l bo‘g‘imlari patologiyasi bo‘lgan bemorlarda ultratovush tekshiruvi natijalari va klinik ko‘rsatkichlar o‘rtasidagi bog‘liqlik tahlil qilinib, integral klinik-ultratovush tekshiruvining diagnostik va prognostik ahamiyati yoritilgan.

Tayanch iboralar: tayanch-harakat apparati ultratovush tekshiruvi; qo‘l bo‘g‘imlari patologiyasi; sinovit; kuchli dopplerografiya; klinik baholash; og‘riqning og‘irligi; funksional buzilish; yallig‘lanish artriti; qo‘lning osteoartriti; vizualizatsion-klinik korrelyatsiya.

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ВЗАИМОСВЯЗЬ УЛЬТРАЗВУКОВЫХ И КЛИНИЧЕСКИХ ПОКАЗАТЕЛЕЙ ПРИ ПАТОЛОГИИ СУСТАВОВ КИСТИ

Аннотация

Патология суставов кисти является распространенной клинической проблемой при воспалительных, дегенеративных и метаболических заболеваниях, часто приводящих к боли, скованности и функциональным нарушениям. Сама по себе клиническая оценка может недостаточно выявлять ранние или субклинические структурные изменения. Ультразвуковое исследование (УЗИ) опорно-двигательного аппарата зарекомендовало себя как чувствительный метод визуализации, способный отображать синовиальные, хрящевые и периартикулярные аномалии. В данном исследовании проанализирована взаимосвязь между результатами ультразвукового исследования и клиническими показателями у пациентов с патологией суставов кисти, освещена диагностическая и прогностическая значимость комплексного клинико-ультразвукового исследования.

Ключевые слова: ультразвуковое исследование опорно-двигательного аппарата; патология суставов кисти; синовит; энергетическая допплерография; клиническая оценка; выраженность боли; функциональные нарушения; воспалительный артрит; остеоартрит кисти; визуализационно-клиническая корреляция.

Introduction

Diseases affecting the joints of the hand represent a major cause of disability due to their impact on fine motor function and daily activities. Inflammatory arthritides, osteoarthritis, metabolic disorders, and overuse syndromes often present with overlapping clinical features such as pain, morning stiffness, swelling, and reduced grip strength. However, the severity of symptoms does not always correlate with the extent of structural joint damage.

Clinical evaluation relies on physical examination, pain scales, functional scores, and laboratory markers of inflammation. These parameters, although essential, may fail to detect early synovial inflammation or subtle periarticular involvement. Ultrasound imaging provides real-time visualization of joint and soft tissue structures and allows assessment of disease activity through Doppler techniques. Understanding the relationship between ultrasound findings and clinical indicators is crucial for optimizing diagnostic accuracy and treatment monitoring.

Materials and Methods

Patients presenting with symptoms of hand joint pathology underwent standardized clinical assessment and ultrasound examination. Clinical indicators included pain intensity measured by visual analogue scale (VAS), duration of morning stiffness, joint tenderness and swelling scores, and functional impairment assessed by hand-specific questionnaires.

Table 1. Correlation between ultrasound findings and clinical indicators

Ultrasound parameter	Clinical indicator	Strength of correlation
Synovial hypertrophy	Joint swelling score	Moderate
Power Doppler signal	Pain (VAS), morning stiffness	Strong
Cartilage irregularity	Functional limitation	Moderate
Tendon involvement	Grip strength	Moderate

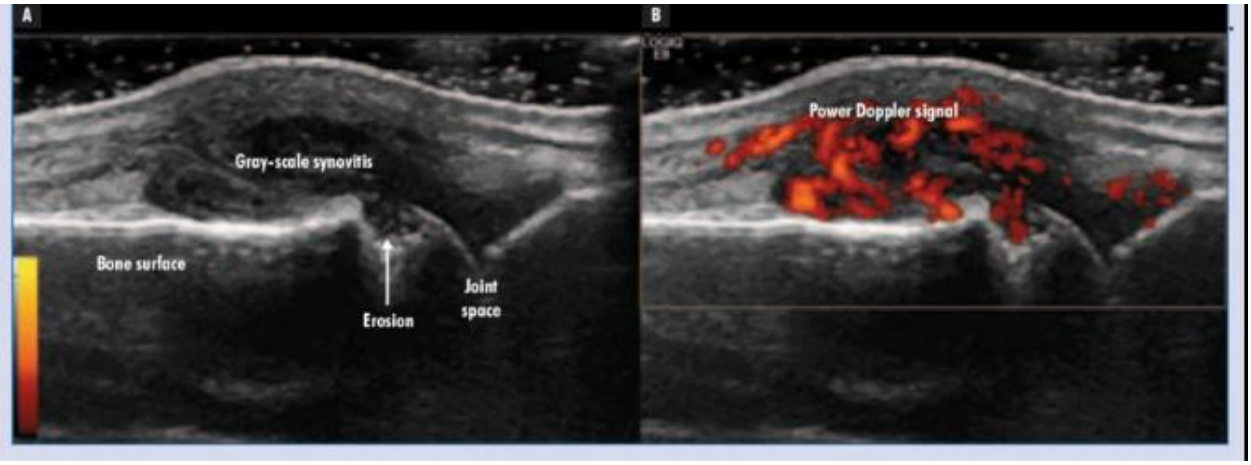
Ultrasound examination was performed using high-frequency linear transducers, evaluating metacarpophalangeal and interphalangeal joints. Grey-scale ultrasound assessed synovial hypertrophy,

joint effusion, cartilage surface irregularities, and tendon involvement. Power Doppler ultrasound was used to evaluate synovial vascularity as a marker of inflammatory activity. Correlation analysis was performed between ultrasound findings and clinical parameters.

Results

Ultrasound detected structural and inflammatory changes in a significant proportion of joints that appeared normal on clinical examination. Synovial hypertrophy and low-grade effusion were frequently identified in patients with mild or moderate pain scores. Power Doppler signal intensity showed a strong correlation with clinical indicators of inflammation, including joint tenderness and duration of morning stiffness.

Figure 1. Ultrasound assessment of synovitis in hand joints



Cartilage abnormalities and osteophytes demonstrated a closer association with functional limitation rather than pain severity. Tendon and periarticular involvement correlated with reduced grip strength and decreased hand function. Overall, ultrasound findings showed moderate to strong correlation with clinical indicators, particularly in inflammatory joint diseases.

Discussion

The findings confirm that ultrasound provides complementary information to clinical evaluation in hand joint pathology. Pain and swelling reflect inflammatory activity but do not always correspond to the degree of synovial proliferation or vascularity. Power Doppler ultrasound emerges as a particularly valuable tool for assessing active inflammation and monitoring therapeutic response.

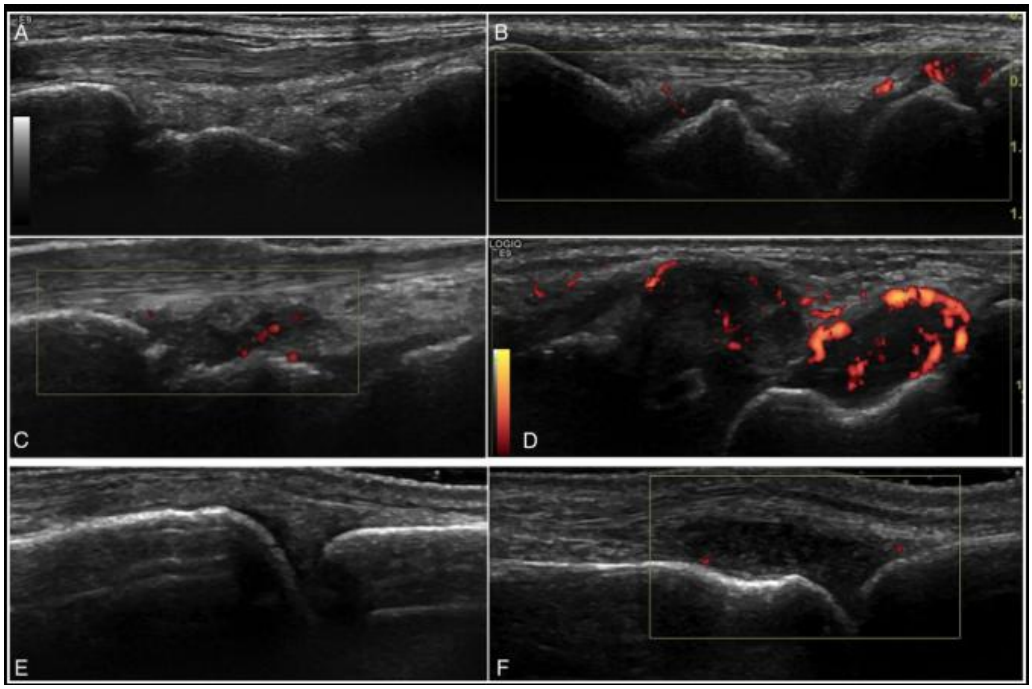
Table 2. Clinical significance of ultrasound findings

Ultrasound finding	Clinical implication
Subclinical synovitis	Early inflammatory disease
Increased Doppler signal	Active inflammation
Cartilage thinning	Degenerative progression
Tenosynovitis	Functional impairment

In degenerative conditions, ultrasound-detected cartilage and periarticular changes correlate more closely with functional impairment than with pain intensity. This highlights the importance of

integrating imaging findings with clinical data to achieve a comprehensive understanding of disease burden and progression.

Figure 2. Ultrasound–clinical correlation in hand joint pathology



Conclusion

There is a significant correlation between ultrasound findings and clinical indicators in hand joint pathology, particularly in inflammatory conditions. Ultrasound enhances diagnostic accuracy by detecting subclinical disease and provides objective markers of disease activity. Combined clinical and ultrasound assessment should be considered a standard approach for the evaluation and follow-up of patients with hand joint disorders.

References

1. Wakefield RJ, Gibbon WW, Conaghan PG, et al. The value of sonography in the detection of synovitis in patients with early rheumatoid arthritis. *Arthritis Rheum.* 2000;43(12):2762–70. doi:10.1002/1529-0131(200012)43:12<2762::AID-ANR14>3.0.CO;2-#

2. Backhaus M, Burmester GR, Gerber T, et al. Guidelines for musculoskeletal ultrasound in rheumatology. *Ann Rheum Dis.* 2001;60(7):641–9. doi:10.1136/ard.60.7.641

3. Naredo E, Bonilla G, Gamero F, et al. Assessment of inflammatory activity in rheumatoid arthritis: A comparative study of clinical evaluation with grey-scale and power Doppler ultrasonography. *Ann Rheum Dis.* 2005;64(3):375–81. doi:10.1136/ard.2004.023929

4. Szkudlarek M, Court-Payen M, Jacobsen S, et al. Interobserver agreement in ultrasonography of the finger and toe joints in rheumatoid arthritis. *Arthritis Rheum.* 2003;48(4):955–62. doi:10.1002/art.10877

5. Scheel AK, Hermann KG, Kahler E, et al. A novel ultrasonographic synovitis scoring system suitable for analyzing finger joint inflammation in rheumatoid arthritis. *Arthritis Rheum.* 2005;52(3):733–43. doi:10.1002/art.20871

6. Hammer HB, Kvien TK. Ultrasonography in rheumatoid arthritis: An overview of current knowledge. *Nat Rev Rheumatol.* 2012;8(12):699–706. doi:10.1038/nrrheum.2012.168

7. Keen HI, Wakefield RJ, Conaghan PG. A systematic review of ultrasonography in osteoarthritis. *Ann Rheum Dis.* 2009;68(5):611–9. doi:10.1136/ard.2008.092981

8. D'Agostino MA, Terslev L. Imaging evaluation of the joint in inflammatory and degenerative diseases: Ultrasound versus conventional radiography. *Rheumatology (Oxford).* 2016;55(Suppl 2):ii18–ii24. doi:10.1093/rheumatology/kew019

9. Negmatov I.S., Mansurov D.Sh. Tizza bo'g'imini to'liq endoprotezlashda kompleks reabilitatsiya: hayot sifatini oshirish omili sifatida. *New Day in World Medicine.* 2024;3(6):45–50.

10. Турдуматов Ж.А., Мардиева Г.М. II типдаги қандли диабетда ўпканинг сурункали обструктив касаллиги рентгенологик семиотикаси [Рентгенологическая семиотика хронической обструктивной болезни лёгких при сахарном диабете II типа]. Журнал гуманитарных и естественных наук. 2025;2(19):235–241. URL: https://journals.tnmu.uz/index.php/gtfj/article/view/1295

11. Жалилов Х. М. и др. Краткая история искусственного интеллекта и роботизированной хирургии в ортопедии и травматологии и ожидания на будущее //Central Asian Journal of Medical and Natural Science. – 2022. – Т. 3. – №. 6. – С. 223-232.

12. Гиясова Н. К., Негматов И. С. Молекулярный состав хряща при остеоартрите коленного сустава //Science and Education. – 2023. – Т. 4. – №. 5. – С. 483-495.

13. Негматов И. С. ЭТАПНАЯ РЕАБИЛИТАЦИЯ ПАЦИЕНТОВ ПОСЛЕ РЕКОНСТРУКЦИИ ПЕРЕДНЕЙ КРЕСТООБРАЗНОЙ СВЯЗКИ КОЛЕННОГО СУСТАВА //Healthway. – 2025. – Т. 1. – №. 2. – С. 180-190.

14. Ходжанов И.Ю., Жалилов Х.М., Мансуров Д.Ш. Современные аспекты эпидемиологии и терапии венозных тромбоэмболических осложнений при травмах. *Российский хирургический журнал*. 2025;1(1):72-78.

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16. Турдуматов Ж. А., Мардиева Г. М. II ТИПДАГИ ҚАНДЛИ ДИАБЕТДА ЎПКАНИНГ СУРУНКАЛИ ОБСТРУКТИВ КАСАЛЛИГИ РЕНТГЕНОЛОГИК СЕМИОТИКАСИ //Журнал гуманитарных и естественных наук. – 2025. – №. 19 [2]. – С. 235-241.

17. Негматов И. С. НЕМЕДИКАМЕНТОЗНАЯ ТЕРАПИЯ КОЛЕННОГО ОСТЕОАРТРИТА: КЛЮЧЕВЫЕ ПОДХОДЫ И ВЛИЯНИЕ ФИЗИОТЕРАПИИ //Healthway. – 2025. – Т. 1. – №. 1. – С. 262-272.

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