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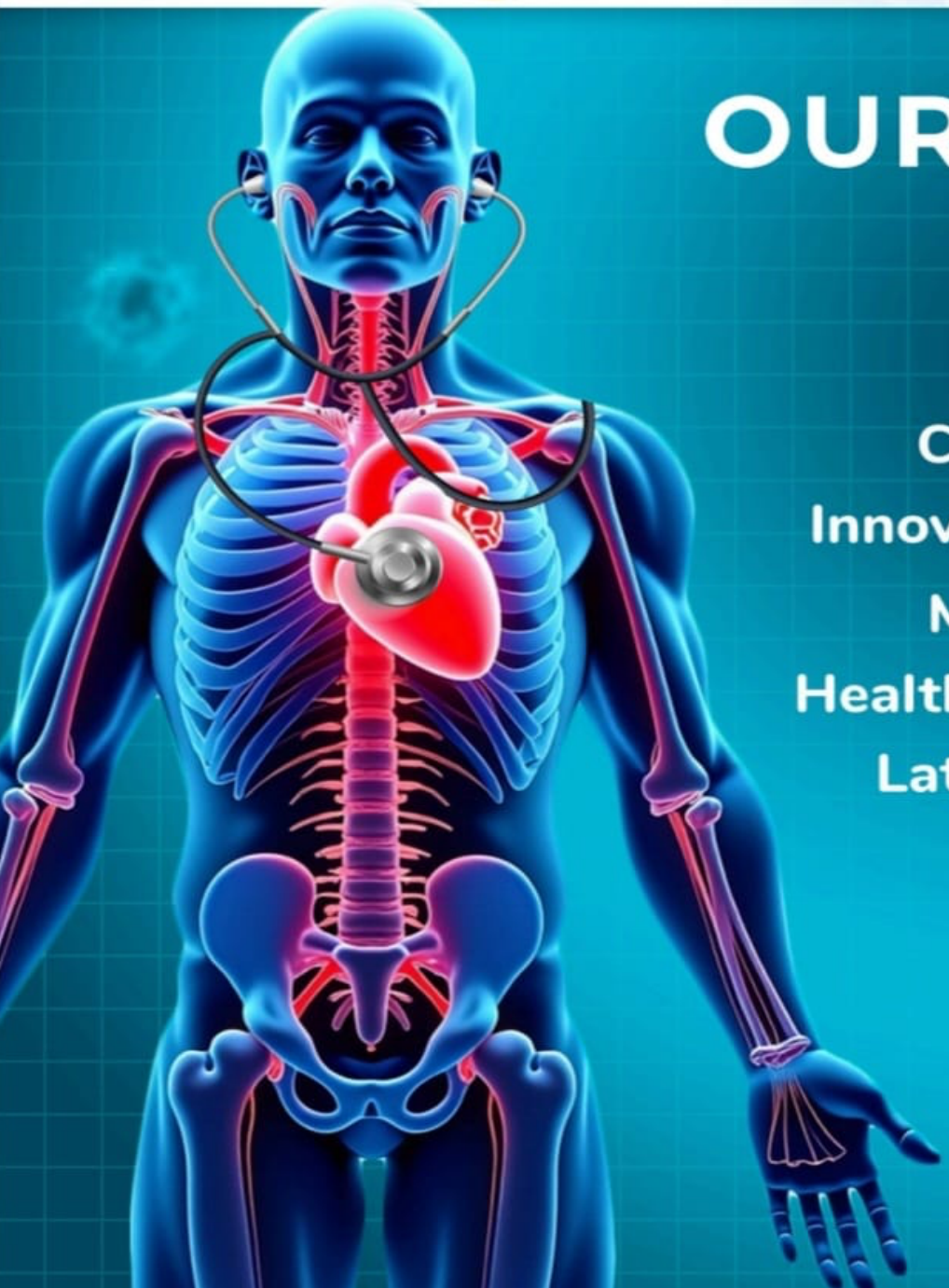

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Tetanus Infection from Shared Needle: Analysis of Three Fatal Cases

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Keywords: tetanus, parenteral drug use, tetanus prophylaxis, non-sterile needles

Abstract: *This presentation analyzes the clinical progression and outcomes of three cases of tetanus infection in drug users who used non-sterile syringes and had similar epidemiological risk factors. Despite hospitalization from the emergency and critical care departments and receiving intensive therapy, all three patients succumbed to the disease. A striking observation was that earlier symptom onset correlated with earlier mortality. This aligns with literature findings, particularly studies indicating a sharply increased mortality risk in patients with an incubation period of ≤7 days. Although tetanus has become rarer in the era of vaccinations, it remains a significant concern among unvaccinated individuals, among drug users who utilize non-sterile injection methods. This case series underscores the rapid and lethal nature of tetanus in this high-risk group and highlights the urgent need for preventive measures.*

1. Introduction

Although tetanus has become a rare diagnosis since the introduction of widespread vaccination programs, it still contributes to significant morbidity and mortality worldwide. Clinically, tetanus is an acute, life-threatening disease characterized by muscle rigidity and spasms (1). It is caused by Clostridium tetani spores, which enter the body through skin abrasions or open wounds. In anaerobic conditions, these spores activate and release tetanospasmin, a neurotoxin that causes painful muscle contractions. High-risk groups include unvaccinated individuals, the elderly, diabetic patients, and intravenous drug users (2).

2.1. Patient 1

A 28-year-old male patient presented to the hospital with trismus, neck stiffness, and dysphagia seven days after using a non-sterile needle. Physical examination revealed widespread muscle spasms and respiratory distress.

Laboratory findings included leukocytosis (15,200/mm³), elevated creatine kinase (18,000 U/L), mild renal and hepatic dysfunction, and altered mental status. Toxicology screening was negative for drug metabolites.

The patient received 5,000 IU of tetanus immunoglobulin (TIG), antibiotics, sedation

with benzodiazepines, mechanical ventilation support, and supportive therapy. Despite treatment, he succumbed to multiple organ failures three days after symptom onset.

2.2. Patient 2

A 34-year-old female patient presented with neck stiffness, opisthotonus, and dysphagia ten days after a drug injection. She exhibited seizures and cyanosis.

Laboratory findings included leukocytosis (17,300/mm³), elevated CK (21,500 U/L), hyperkalemia, and metabolic acidosis. Drug metabolites were not detected.

She administered 6,000 IU of TIG, antibiotics, midazolam, and mechanical ventilation support. Due to severe spasms, she died five days later.

2.3. Patient 3

A 19-year-old male presented to the emergency department with trismus, rigidity of the neck and back muscles, and difficulty swallowing and speaking on the 12th day after drug use. His vital signs were stable, and he was alert. Physical examination revealed pale mucous membranes, excessive sweating, an edematous hyperemic injection site at the cubital fossa, and old cut marks on his forearms.

Following consultations with infectious disease specialists, toxicologists, and neurologists, a diagnosis of tetanus was confirmed. The patient was administered 5,000 IU of TIG and admitted to the intensive care unit.

His symptoms had begun two days prior, and he had a history of recent drug use. Despite 12 days of intensive care treatment, he succumbed to the disease.

All three patients were brought to the hospital via emergency medical services and underwent initial Emergency and Critical Care Department assessment. None had a known vaccination status, and accurate information on their immunization history could not be obtained from relatives. Additionally, none had a history of typical traumatic injuries or open wounds related to tetanus. However, they had used the same non-sterile syringe multiple times, making it the likely infection source.

Comparison of Cases

Parameter	***Patient 1***	***Patient 2***	***Patient 3***
Age / Gender	28 / Male	34 / Female	19 / Male
CK (U/L)	18,000	21,500	16,500
Leukocyte Count (mm³)	15,200	17,300	14,500
Symptom Onset	Day 7	Day 10	Day 12
Mortality	Day 10	Day 15	Day 20

3. Discussion

These three cases of tetanus were linked to non-sterile needle use, resembling previously reported international cases where drug users with unknown vaccination status presented with characteristic tetanus symptoms—trismus, muscle spasms, and dysphagia (3).

All three patients received TIG and intensive therapy. However, unlike a previously reported international case where the patient survived, all of our patients died despite their young age. This comparison highlights the critical role of early diagnosis, precise laboratory assessments, and comprehensive

intensive care. It also underscores the need for vaccination campaigns and education on sterile injection practices among high-risk groups.

A case study reported a 45-year-old male drug user with multiple open and purulent injection site wounds, one of which was identified as the infection source. His clinical presentation included trismus, dysphagia, and widespread spasms. Despite intensive treatment, he died (4).

While our three patients also had a history of drug use, they lacked the typical open wounds associated with tetanus infections. They had swelling and edema at injection sites but no visible purulent infections. This suggests that tetanus can develop not only from traumatic wounds but also silently from non-sterile injections. Therefore, clinical suspicion, proactive diagnosis, and prophylactic vaccination are crucial.

One key observation in our cases was the correlation between the incubation period and time to mortality. Patients with earlier symptom onset experienced more rapid disease progression and earlier death. Conversely, those with later symptom onset survived longer. This supports literature findings that severe tetanus is associated with shorter incubation periods.

A study conducted at Çukurova University found a 75% mortality rate among patients with an incubation period of ≤7 days, significantly higher than in those with longer incubation periods. This aligns with our findings (5).

A separate study from a tertiary hospital in Turkey between 1990 and 2000 found that patients with an incubation period of ≤8 days had a 4.8 times higher mortality risk. Additionally, each day of delayed hospital admission increased the mortality risk. Our cases exhibited a similarly rapid progression to fatal outcomes, consistent with these findings (6).

In developing countries, including Azerbaijan, vaccine hesitancy due to social and cultural resistance, lack of scientific awareness, and inadequate vaccination monitoring continues to contribute to preventable diseases like tetanus, making them significant public health risks.

4. Conclusion

These three cases highlight how non-sterile needle use, unknown vaccination status, and delayed clinical intervention resulted in fatal outcomes. The inverse correlation between incubation period length and mortality rate suggests that it may serve as a crucial prognostic factor. Tetanus remains a critical issue in high-risk groups such as drug users, emphasizing the urgent need for strengthened vaccination programs and public health awareness initiatives.

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First case report- Far Eastern Scarlet Fever (FESLF) associated with Still's disease in adults.

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Keywords: yersiniosis, Y.pseudotuberculosis, Still's disease, FESLF.

Abstract. *Yersiniosis is a rare and sporadic infection that is most transmitted through raw or undercooked pork products. It may present clinically with arthritis, pharyngitis, hepatitis, persistent fever, abdominal pain, mesenteric lymphadenitis, or symptoms mimicking appendicitis [1;2]. Although it is considered a sporadic infection, difficulties in culturing the organism, its high genetic similarity (64%) with closely related species (Yersinia pestis, Yersinia enterocolitica), cross-reactivity of O:9 serovars with Brucellosis, and variability in clinical presentation can lead to delays in diagnosis [3;4]. Yersinia pseudotuberculosis produces a superantigen called YPM (Y. Pseudotuberculosis-derived mitogen), which plays a key role in the pathogenesis of Far East Scarlet-Like Fever (FESLF), causing rapid proliferation of T lymphocytes and toxic shock syndrome [1]. Therefore, it tends to have a more severe clinical course compared to other forms of yersiniosis. Mortality rates range between 11% and 75% [5;6].*

In 1984, R. Colebunders and colleagues reported a case of Still's disease associated with Yersinia enterocolitica [7]. There has been no previously reported clinical case linking Yersinia pseudotuberculosis with Still's disease. The clinical case we present demonstrates that Yersinia pseudotuberculosis may also be associated with Still's disease. In the presented clinical case, a diagnosis of Still's disease was established in a 19-year-old patient with confirmed Y. pseudotuberculosis infection, due to an inadequate therapeutic response, followed by clinical remission.

Introduction.

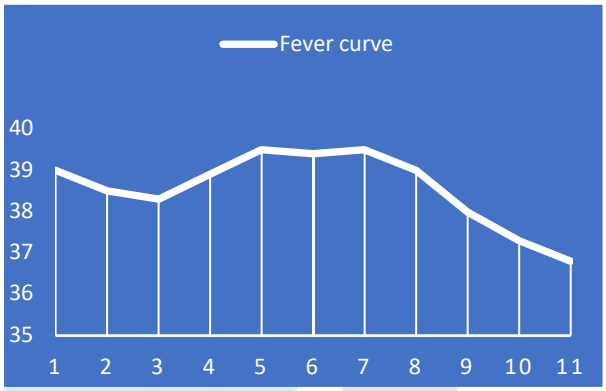
Although Yersinia pseudotuberculosis infections occur sporadically in Europe, they have caused epidemics in Russia and Japan [8;9]. It is the only one known gram-negative bacteria that produces a superantigen, leading to a scarlet fever-like syndrome. During the 1959 epidemic of Y. pseudotuberculosis in the Vladivostok region of Russia, previously misdiagnosed as scarlet fever. However, later it was termed FESLF due to its disting clinical presentation [8].

Case Report.

A 19-year-old male patient without known chronic illnesses. Clinical presented with persistent fever lasting 15 days, fatigue, joint pain, skin rashes and abdominal pain. Initially, he had two days of diarrhea. His dietary history is related to frequent consumption of raw sausages, fast food, and energy drinks. During the illness course, he received various antibiotic regimens, including levofloxacin for 3 days, ciprofloxacin for 2 days, followed by a combination of ceftriaxone and metronidazole. On the fourth day of this last treatment, he applied to our hospital. His general condition was assessed as moderately

severe. He was conscious and oriented, responding appropriately to questions. On physical examination, fever is 39.2°C, oxygen saturation (SpO_2) of 99%, and tachycardia. Macular rashes with mild pruritus were seen on the hands and feet. The oropharynx was hyperemic, abdominal palpation as well as examination of the left sacroiliac joint elicited tenderness. Laboratory investigations resulted in left-shifted leukocytosis (WBC: 19,000/µL; Neutrophils: 90%, IG: 2.7%), thrombocytosis (PLT: 417,000/µL), elevated liver enzymes (ALT: 193 U/L, AST: 137.4 U/L), coagulopathy, and elevated inflammatory markers (ESR: 29 mm/h, CRP: 90 mg/L, ferritin: >2000 ng/mL). PCT-0.4 ng/mL, ASO- 312 IU/mL, while both rheumatoid factor and ANA were negative.The patient was hospitalized and empirically started on piperacillin-tazobactam. Thoracic and abdominal CT scans revealed nonspecific lymphadenopathy-involving hilar, supraclavicular, cervical, axillary, and mesenteric lymph nodes, with sizes up to 10 mm. Serologic testing for HIV, hepatitis B and C, EBV, and brucellosis was negative. Blood and urine cultures were negative.

On the fifth day of hospitalization, a sample for Yersinia testing was taken and analyzed via PCR using the Bio-Rad platform, and rheumatology consultation was performed. Patients fulfilled all Yamaguchi criteria, and although it is an exclusionary diagnosis, the diagnosis of Adult-onset Still's disease (AOSD) was made. On the same day, PCR for Yersinia enterocolitica/pseudotuberculosis was positive. Accordingly, piperacillin-tazobactam was switched to a combination of ciprofloxacin and gentamicin. The following day, a scarlatiniform rash with a Filatov triangle was observed. Despite antimicrobial therapy, fever persisted around 38°C on day three of the new regimen, prompting the initiation of methylprednisolone at 64 mg/day. With clinical stabilization and evidence of skin desquamation, patient was discharged on day six of treatment with oral trimethoprim-sulfamethoxazole (TMP-SMX).



Discussion.

The patient's frequent consumption of Russian-produced raw sausages, the initial episode of diarrhea, and the clinical presentation led us to suspect a Yersinia infection. Positive PCR results along with negative culture results highlighted the importance of this diagnostic approach [3]. Although the Bio-Rad device could not differentiate between Yersinia enterocolitica serovars O:3, O:9, and Yersinia pseudotuberculosis serovar T:1, the development of FELSF syndrome in this patient suggested that the causative agent was the Y. pseudotuberculosis strain. This strain produces toxic superantigens, which play a significant role in the pathogenesis of FELSF [8;10] .

The activation of Still's disease by Y. pseudotuberculosis can be supported through several pathogenetic mechanisms. The pathogenesis of Still's disease is related to the activation of the inflammatory cascade, where PAMPs (pathogen-associated molecular patterns) and DAMPs (damage-associated molecular patterns) trigger the activation of macrophages and neutrophils through TLRs (Toll-like receptors). The generation of these danger signals can be triggered by various bacteria and viruses, including Yersinia strains. Y. pseudotuberculosis causes hyperactivation of the immune system. Activated IL-1β and IL-18 play crucial roles in the onset of Still's disease [11]. While previous literature has identified several viruses and intracellular bacteria (such as Chlamydia pneumoniae, Mycoplasma pneumoniae, Borrelia burgdorferi, Brucella abortus, and Yersinia enterocolitica) in relation to the activation of Still's disease, Y. pseudotuberculosis had not been previously mentioned [12]. However, the genetic similarity between Yersinia strains further supports the relevance of this finding for Y. pseudotuberculosis.

There is a genetic predisposition to arthritis and the development of Still's disease in individuals with specific HLA gene alleles following a Yersinia infection [13;14].

Yersinia microorganisms are ferrophilic, meaning patients with disturbances in iron metabolism are at higher risk [15;16]. However, during Still's disease, the elevated ferritin levels do not result from increased iron stores but are rather an acute-phase reactant. Consequently, ferritin during this period consists of the iron-poor apoferritin form. Thus, we cannot conclude that Yersinia infection directly triggers Still's disease [17]. This observation is further supported by previous reports of other infections related to Still's disease.

The diagnosis of Still's disease is one of exclusion, and prior infections should be ruled out before confirming the diagnosis. However, despite five days of empirical treatment with piperacillin-tazobactam and three days of specific therapy, the patient's condition did not improve. Previous literature reports that clinical responses to Yersinia pseudotuberculosis infection were observed within 48 hours of piperacillin-tazobactam treatment [18]. No resistance has been reported to ciprofloxacin and gentamicin combination. Due to the persistence of the clinical presentation, Still's disease was suspected, and we initiated treatment accordingly.

Conclusion.

Although Yersinia pseudotuberculosis is a rare infection, it is often difficult to diagnose. The use of PCR significantly increases diagnostic accuracy. Although not previously documented in the literature, this case demonstrates that Y. pseudotuberculosis can indeed trigger Still's disease. Future studies exploring the role of HLA gene polymorphisms in the pathogenesis of FELSF and their correlation with clinical outcomes could provide valuable insights.

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Correlations Between COVID-19 Pneumonia and Long-Term Lung Injuries

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Keywords: COVID-19 pneumonia, interstitial lung disease, KL-6, lung fibrosis, post-COVID-19, spirometry.

Abstract *This study investigates the correlation between COVID-19 pneumonia and long-term lung injuries through clinical, radiological, and biomarker analyses. Conducted prospectively at Azerbaijan Medical University, the study evaluated 210 patients from 2021 to 2023. Biomarkers such as KL-6, CRP, D-dimer, and ferritin were analyzed alongside clinical and spirometric parameters. Results revealed persistent lung injuries in 32% of cases, with fibrosis identified as a major contributor to functional decline. Elevated KL-6 and D-dimer levels were strongly associated with lung damage and inflammatory processes, suggesting their utility as biomarkers for monitoring post-COVID-19 complications. Radiological examinations and spirometry indicated significant decreases in lung function, including FEV1 and FVC levels. The study underscores the importance of long-term follow-up and individualized treatment strategies to mitigate the lasting effects of COVID-19 on lung health, highlighting the necessity for further research to optimize recovery and improve patients' quality of life.*

1. Introduction

The SARS-CoV-2 pandemic has caused more than 700 million confirmed infections and more than 6 million deaths worldwide. The natural progression, underlying pathophysiology, and long-term sequelae of SARS-CoV-2 infection remain incompletely understood. Many patients experience the continuation or resumption of various symptoms after an acute infection period, which severely affects their functional performance and quality of life. The term “Long COVID” has been defined by the World Health Organization (WHO) as a set of long-term symptoms that persist or develop within three months of COVID-19 and exist for at least two months. This condition presents significant clinical challenges for healthcare providers and imposes substantial social and economic burdens [1].

Within three months of recovery from COVID-19, many patients continue to experience a variety of symptoms, mostly respiratory and neuropsychological complaints [2]. Potential mechanisms that may cause Long COVID include persistence of viruses or their components, autoimmune

processes, metabolic and endocrine disorders, psychosocial factors, microvascular and mitochondrial dysfunction [3]. Long-term complications have been observed both after severe illness and after infections with some different pathogens. In the context of long-lasting COVID, changes in different organisms have been identified through diagnostic research offered by different societies. Additionally, sometimes the impact of minor organic changes on the etiological origin of complaints is usually limited [4].

Given the many patients recovering from COVID-19, Long-lasting COVID remains an unintended problem. Therefore, it is important to identify patients at risk of permanent disorder in a health condition and to carry out a logical risk classification for their diagnosis and treatment. Direct contact between diagnoses and subjective complaints expressed in different forms appears to be possible in everyday practice only to a limited extent [5]. When we look at it from a general perspective, the relationship between COVID-19 pneumonia and persistent lung injuries has not yet been fully understood. To understand the long-term effects of the disease, it is important to perform radiological, clinical, and biomarker levels evaluations. This study aims to contribute to existing knowledge by examining the pathophysiology, dynamics, and long-term effects of post-COVID-19 lung injuries.

3. Discussion

The results of the correlation analysis between COVID-19 pneumonia and persistent lung lesions revealed several important findings based on clinical and laboratory examinations of patients. The main objective of the study was to investigate the impact of COVID-19 on lung tissue and the long-term consequences of this effect. To conclude, the relationships between different biomarkers and clinical parameters were carefully analyzed.

An inverse correlation between KL-6 and TLC demonstrated a significant association between lung tissue damage and elevated KL-6 biomarker levels. This finding confirms that COVID-19 pneumonia induces significant inflammatory changes in lung tissue, which are directly correlated with elevated KL-6 levels. Thus, it can be concluded that KL-6 may be an important biomarker in monitoring lung injuries.

Furthermore, direct correlation between D-dimer and TCL analysis showed an interaction of inflammatory and thrombosis processes in lung lesions. COVID-19 pneumonia was found to increase the risk of thrombosis and be associated with lesions in the lungs. An increase in D-dimer acts as an indicator of the development of thrombosis in lung lesions. Additionally, a direct correlation was observed between CRP levels and TLC. This finding reveals the ongoing impact of COVID-19 on inflammatory processes in the lungs and how these effects negatively affect lung functions.

The direct correlation between KL-6 and D-dimer suggests that thrombosis is interrelated with pulmonary lesions and inflammatory processes in the respiratory system. This association is an important finding indicating the development of lung fibrosis caused by

COVID-19 and a higher risk of thrombosis in those patients. The direct correlation between D-dimer and CRP, further elucidates the interactions of inflammatory and thrombosis processes.

Radiological examinations have shown that lung fibrosis is observed in 32% of cases, indicating that COVID-19 pneumonia leads to persistent lung damage, resulting in fibrosis. Fibrosis leads to the progressive stiffening of lung tissue and subsequent loss of function. This severely limits lung function. Physical examinations and spirometric tests have demonstrated a significant decrease in FEV1 and FVC indicators. Specifically, FEV1 has been observed to be 60±12% and FVC 58±15%. These results highlight the substantial impact of lung injuries on respiratory function and underscore how persistent lung damage significantly diminishes patients' quality of life.

All these results highlight that the impact of COVID-19 pneumonia on the lungs is long-lasting and that persistent lung injuries require a readjustment of medical approaches. It is important to conduct additional research to further clarify this situation and improve treatment strategies. The results suggest that biomarkers and radiological changes play an important role in the follow-up of these patients, which may enable individualization of treatment approaches and improvement of patients' functional status.

Although there are similarities in the objectives of our study and the research by Robey et al. regarding the long-term effects of COVID-19, there are several key differences. Our study was conducted using a prospective method and was based on broader biomarker analyses (KL-6, CRP, D-dimer, ferritin, and other indicators). This approach provided more comprehensive information about the pathophysiological mechanisms of COVID-19 and its inflammatory effects [6]. Both studies found that KL-6 levels were elevated in COVID-19 patients and that this indicator was associated with the severity of lung damage. Additionally, our study emphasized the impact of other inflammatory indicators such as CRP and ferritin on the post-COVID-19 recovery process, and the correlation between these indicators was evaluated in detail. The research by Robey et al. primarily focused on lung function and presented biomarker analyses in a limited manner. In contrast, our study provided more comprehensive results through biomarker analyses and functional indicators. It was particularly emphasized that long-term complications were more severe in groups with a severe course of COVID-19. Furthermore, results such as the decrease in KL-6 overtime and the increase in oxygenation levels were obtained. While the effects of gender and age factors on the results were assessed in the study by Robey et al., our study primarily focused on inflammatory and functional indicators, and gender and age factors were not considered statistically significant. Additionally, our study presents detailed paired comparisons and changes over time, along with statistically significant differences between groups.

Consequently, both studies make important contributions in terms of investigating the

long-term effects of COVID-19. But while Robey et al.'s study focuses more on the physiological parameters of lung function, our study provides more extensive information on the sequelae of COVID-19 through biomarker analyses and functional indicators. These studies are extremely important in terms of understanding the long-term effects of COVID-19 and shaping post-pandemic recovery strategies.

Also, our study evaluated the dynamics of fibrotic changes after COVID-19 during long-term follow-up periods and found that these changes can be reversed in most cases. However, in another study, fibrosis cases were identified because of short-term follow-up (average 41.5 days), where fibrosis was detected in 41% of cases. Our study emphasized tracking the KL-6 biomarker in the long term, revealing a weak but significant correlation with CRP and D-dimer levels. By providing additional information to explain the relationship of KL-6 to fibrosis, we have revealed the significant potential of this biomarker in diagnosing and monitoring fibrotic changes after COVID-19. In the other study, CRP, d-dimer, ferritin, and troponin levels were shown to be significantly higher in the fibrotic group than in the non-fibrotic group, but KL-6 levels were not measured. This has limited the ability to validate fibrotic changes according to more specific biomarker levels [7].

Regarding radiological indicators, in our study the CT severity index was assessed at different follow-up periods and was found to decrease over time. This approach is advantageous for monitoring the progression and potential reversibility of fibrotic changes over time. In another study, however, the CT severity index was calculated based only on radiographic images in active disease during the hospitalization period and was noted to be significantly higher in the fibrotic group (mean 17) than in the non-fibrotic group (average 7).

Thus, our work has provided a more comprehensive approach to the long-term monitoring and diagnosis of post-COVID-19 fibrosis, offering greater insight into the dynamics and potential reversibility of fibrotic changes. Another study emphasized the correlation between fibrosis cases and early radiological and biomarker findings based on short-term follow-up results.

4. Conclusion

In conclusion, our study has more broadly evaluated the dynamics and reversal potential of post-COVID-19 fibrotic changes in long-term follow-up periods. This study examined the relationship of biomarkers such as KL-6, CRP, and d-dimer to fibrosis, highlighting the clinical significance of these indicators. Additionally, by showing a decrease in the CT severity score over time, it has been proven that fibrotic changes can be more accurately assessed through long-term follow-up. Another study, based on short-term follow-up results, emphasized the relationship between severe radiological indicators during the hospitalization period and elevated CRP, d-dimer, ferritin levels with the risk of fibrosis. While both studies contribute to the field of post-COVID-19 fibrosis diagnosis and tracking, long-term

follow-up offers superior results in terms of explaining the dynamics of fibrotic changes.

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Delayed Splenic Rupture in an Adolescent Patient: Organ-Sparing Laparoscopic Surgery – A Successful Clinical Case Presentation

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Keywords: Delayed splenic rupture, abdominal trauma, hemoperitoneum, diagnostic laparoscopy, laparoscopic intervention, organ-sparing surgery

Abstract *Delayed splenic rupture (DSR) is a rare but potentially life-threatening traumatic complication. This presentation discusses a case of DSR in a 15-year-old adolescent who developed the condition one week after sustaining blunt abdominal trauma while riding a jet ski. The patient presented to our clinic with abdominal pain, nausea, and vomiting. Imaging studies revealed extensive intra-abdominal hemorrhage. Emergency diagnostic laparoscopy identified active bleeding at the gastrosplenic and splenocolic ligaments, which was successfully controlled through localized coagulation, preserving the spleen. The laparoscopic procedure was completed without complications, and the patient recovered uneventfully. This case underscores the importance of high clinical suspicion, timely diagnostic intervention, and an organ-sparing approach by an experienced surgeon in managing delayed splenic ruptures. The application of a multidisciplinary team approach and minimal invasive techniques facilitate positive outcomes in such cases.*

1. Introduction

Traumatic abdominal injuries, particularly in children and adolescents, are medical conditions that can lead to severe clinical outcomes. In this age group, the spleen is considered one of the most frequently injured organs in the abdominal cavity. The spleen plays crucial roles in immune response, erythrocyte storage, and the filtration of aged blood cells, making its preservation particularly significant in pediatric and adolescent patients.

While splenic injuries typically manifest with clinical symptoms immediately following trauma, in some cases, a rare and dangerous condition known as delayed splenic rupture (DSR) can occur. DSR is characterized by spontaneous rupture of the spleen more than 48 hours after blunting abdominal trauma, often developing without specific or any clinical signs during the initial trauma period. First described by Baudet in 1907, this condition is associated with a latent period of symptom absence, referred to as the "Baudet latent period." DSR can lead to unexpected hemorrhage and hemodynamic instability, posing significant risks to the patient.

Considering the vital and immunological functions of the spleen, organ-sparing treatment strategies are preferred, especially in children and adolescents. These approaches aim not only to ensure the patient's survival but also to preserve long-term quality of life. The advancement of laparoscopic surgery has introduced new possibilities in the management of traumatic injuries. This technique, used for both diagnostic and therapeutic purposes, reduces postoperative discomfort and facilitates quicker recovery.

This article presents the clinical case of a 15-year-old adolescent who developed DSR following a jet ski accident and was successfully treated with an organ-sparing laparoscopic approach, despite the presence of a large hemoperitoneum. The presentation highlights the critical importance of clinical suspicion, timely diagnostic intervention, and the effectiveness of minimal invasive approaches in managing such rare and life-threatening conditions.

2. Case Presentation

A 15-year-old male patient presented to our clinic with complaints of abdominal pain, nausea, and vomiting that had started the previous day. Initial ultrasound and CT imaging revealed approximately 2 liters of intra-abdominal fluid (blood), prompting urgent referral to our facility. Repeat evaluations showed a significant drop in hemoglobin levels (11.8 → 8.7 g/dL), and contrast-enhanced CT demonstrated widespread, high-density fluid in the abdominal cavity.

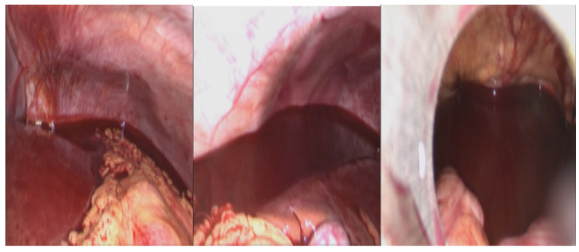

İmage 1: Subdiaphragmatic region, perihepatic area, pelvic cavity

Upon detailed history taking, the patient admitted to falling into the water multiple times while riding a jet ski one week prior. On admission, he was in relatively stable hemodynamic condition (BP: 108/100 mmHg, pulse: 53 bpm), but due to high clinical suspicion, emergency diagnostic laparoscopy was planned.

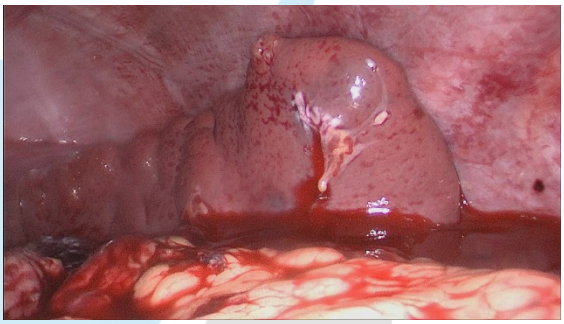

İmage 2: Bleeding spleen

During surgery, 2150 ml of hemorrhagic fluid was aspirated from the abdominal cavity. Lacerations and active bleeding were observed at the gastrosplenic and splenocolic ligaments. Hemostasis was achieved through localized coagulation, and the spleen was preserved. The procedure was completed without complications. The patient remained under observation for 6 days postoperatively and was discharged in stable condition.

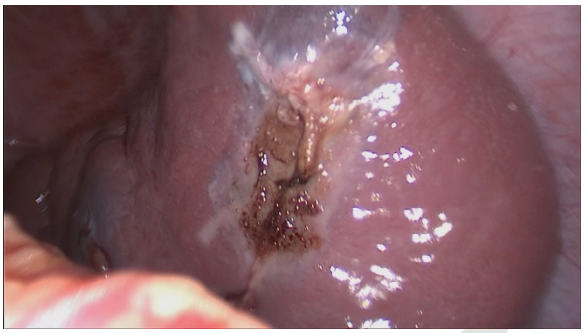

İmage 3: Postoperative outcome

3. Discussion

Delayed splenic rupture (DSR) is a rare but potentially life-threatening complication of blunt abdominal trauma, particularly in children and adolescents. This condition often presents minimal or nonspecific clinical symptoms following the initial trauma, leading to delayed diagnosis and treatment. The patient in this case is a typical example, with initial complaints limited to abdominal pain, nausea, and vomiting, and a history of trauma that was only identified upon further inquiry.

In such cases, clinical decision-making relies not only on imaging and laboratory parameters but also on the surgeon's clinical acumen, experience, and ability to select the appropriate intervention strategy. The patient's significant intra-abdominal hemorrhage and the inability to precisely identify the bleeding source on CT imaging necessitated prompt and decisive action. In this context, the surgeon's clinical intuition and timely decision to proceed with diagnostic laparoscopy were crucial.

During surgery, lacerations and active bleeding were identified at the gastrosplenic and splenocolic ligaments, without direct rupture of the splenic parenchyma. This rare presentation, characterized by ligamentous injuries leading to vascular damage and bleeding, highlights the complexity of such cases. Inexperienced surgeons might have opted for splenectomy in such situations. However, the surgeon in this case correctly assessed the suitability for organ-sparing surgery, effectively controlling the bleeding through localized coagulation and preserving the spleen's functional integrity.

Literature indicates that the success of organ-sparing approaches in high-grade splenic injuries (Grade IV and above) largely depends on the surgeon's experience and real-time assessment during surgery. Less experienced surgeons may be more inclined to perform splenectomy in ambiguous cases. However, preserving the spleen in this age group is critical to prevent postoperative infections and immunodeficiency.

Additionally, the choice of a laparoscopic approach in this case contributed to the diagnosis and reduced invasiveness. Laparoscopic surgery offers advantages such as less pain, shorter hospitalization, and faster recovery, which are particularly beneficial in pediatric patients.

In summary, this clinical case emphasizes the importance of diagnostic vigilance and surgical expertise in managing delayed splenic ruptures. The surgeon's ability to make swift decisions and prioritize organ-sparing techniques facilitated the patient's recovery without functional organ loss. Such cases underscore the value of a multidisciplinary approach and the necessity of experienced surgical teams in achieving favorable outcomes.

4. Conclusion

This presentation highlights the potential for delayed splenic rupture to present nonspecific symptoms and the life-saving impact of timely diagnostic and surgical intervention. Despite significant blood loss, an organ-sparing laparoscopic approach was successfully employed, preserving the spleen and allowing for an uncomplicated recovery. These cases underscore the importance of experienced multidisciplinary teams and the effectiveness of organ-preserving strategies in the management of traumatic injuries.

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Hepatoprotective Effects of a Polyherbal and Apitherapeutic Mixture (HEPBAL) in Patients with NAFLD and Viral Hepatitis

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Keywords: phytotherapy, Azerbaijani Propolis, apitherapy, integrative medicine, liver, thistle, Azerbaijani honey, liver fatty disease, hepatitis, alternative treatment.

Abstract: *Ginger, turmeric, black seed, artichoke leaves, Azerbaijani thistle honey, and beebread have a hepatoprotective effect; therefore, they show effective results separately in case of alcohol-dependent and non-alcoholic Liver obesity, hepatitis and toxic liver damage. We studied how it can affect liver enzymes and hepatocytes in this group of patients. We took all these natural plants and bee products in the optimal dose required by the body and prepared a paste called Hepbal, so that everyday people could eat comfortably as a food supplement, as well as see the therapeutic and prophylactic results.*

HEPBAL paste for liver Ingredients: *Flaxseed, Ginger, Seed of thistle, Powder of Yellow Ginger, black cumin, and honey. Benefits: Herbal paste prepared based on well-tested recipes improves the function of the liver and gallbladder. As a hepatoprotection, it affects the recovery of liver cells in liver diseases (hepatitis and cirrhosis), spleen disease, bile duct infections, gallstones in gallbladders, inflammatory bowel disease, colitis and cholecystitis. It helps to remove toxic substances while taking medicine (antibiotics, chemotherapy, painkillers, etc.).*
Side effects: Individual sensitivity to the contents of the product. Usage: In acute process 1 teaspoon, during chronic diseases 1 dessertspoon twice a day before eating. Results: 48 women and 54 men with the third level of fatty liver dystrophy decreased to the second level (fibrosis did not occur). During the treatment of 114 patients who had hepatitis C virus, I used HEPBAL paste as a protector for the liver. After the analysis, 24 patients, who had liver cirrhosis ALT and AST in the blood reduced twice. Another 81 patients from 90 who had virus had disappeared in blood analyses and in the exogenous factor of liver and GGT in the blood get normal.

erbal products have become increasingly popular, especially among those with chronic diseases. Milk thistle honey has been used for hundreds of years by herbalists and physicians alike to treat a wide range of liver pathology, including fatty liver disease, hepatitis, cirrhosis, and to protect the liver from environmental toxins. Today, millions of people consume milk thistle to support healthy liver function. Researchers have focused their efforts towards studying silymarin, a mixture of flavonolignans extracted from milk thistle, as well as the most active ingredient of this extract, silybin. Silymarin and silybin have become some of the most prescribed natural compounds, and the use of the two names is often interchangeable. However, each has a different clinical purpose, but there are no definitive results in terms of clinical efficacy. Currently, there is no regulation of herbal products such as milk thistle in the United States as they are not considered drugs and are not under the supervision of the US Food and Drug Administration. Like most herbal products, the FDA does not approve or recommend the usage of milk thistle as a treatment for any medical condition.

Recent studies have focused on the role of milk thistle in treating nonalcoholic fatty liver disease, a common hepatic manifestation of metabolic syndrome. The prevalence of NAFLD in western countries is approximately 20% to 30%. Currently, there is no consensus approach when it comes to the treatment of NAFLD. Most clinicians approach the disease by emphasizing lifestyle modification, including diet, weight loss, and limiting alcohol intake. However, studies suggest milk thistle can exert beneficial effects in patients with NAFLD. Data indicate that silymarin treatment correlated with a reduction in insulin resistance and a significant decrease in fasting insulin levels. Patients treated with 600mg/day of silymarin for 12 months demonstrated lower fasting insulin levels. A separate clinical trial evaluated the effectiveness of silymarin compared to metformin and pioglitazone in NAFLD patients. Research showed that patients treated with silymarin had significantly lower transaminase levels compared to those treated with metformin or pioglitazone. In a sample of 25 patients, treated for four months with 200 mg silymarin three times a day before meals, there was a significant reduction in blood glucose levels (from 156 +/- 46 mg/dl to 133 +/- 39 mg/dl), compared to an increase in the placebo-treated group. In the same period, their HbA1c levels also dropped by an average of 1 point. The same group of patients also demonstrated significantly reduced levels of total cholesterol, triglycerides, and LDL. Another study aimed to evaluate the efficacy of combined treatment, which includes vitamin E, silybin, and phospholipids, demonstrated that this complex improves liver damage, especially plasma markers of liver fibrosis, as well as insulin resistance.

Nonalcoholic Fatty Liver Disease (NAFLD) is known to be the most prevalent hepatic disorder that is characterized by excessive hepatic fat accumulation, in absence of remarkable alcohol consumption. It affected people around the world in range of 25–30% in developed and 6–35% in developing countries. Although many aspects of NAFLD pathogenesis are not yet fully understood, All

three patients were brought to the hospital via metabolic disturbances such as excessive fat accumulation and insulin resistance play an important role in the pathogenesis of NAFLD. In modern medicine, adherence to lifestyle and dietary modification is a first strategy for NAFLD management or/and prevention of disease progression to cirrhosis and hepatocellular carcinoma. However, many patients fail to comply with the lifestyle modification. Owing to the growing prevalence of NAFLD and paucity of beneficial remedy, a surge of interest to detect novel effective therapy for alleviating or preventing progression of this disease with minimal side effect is required.

In the last decades, growing evidence has shown that investigators are interested in finding effective natural alternatives therapy in the treatment of numerous diseases. Although vary medical plants were used as traditional and self-care, there is lacked sufficient information in efficacy and their possible side-effects on diseases and this issue made it one of the important problems faced by doctors.

Ginger supplementation resulted in a significant reduction in alanine aminotransferase, γ-glutamyl transferase, inflammatory cytokines, as well as the insulin resistance index and hepatic steatosis grade in comparison to the placebo. We did not find any significant effect of taking ginger supplements on hepatic fibrosis and aspartate aminotransferase.

Ginger is the root of *Zingiber officinale* and is one of the most used spices in many countries. Ginger contains active ingredients such as gingerol, shogaol, zingerone and β-bisabolene. In ancient medical practice, ginger was used for treatment of various disorders such as rheumatoid arthritis, neurodegenerative diseases, inflammation and asthma. Previous studies have shown that ginger and its active compounds can exhibit anti-diabetes, anti-cancer and anti-inflammatory properties. It has been shown that ginger extract can exhibit antioxidant activity and reduce the levels of pro-inflammatory biomarkers. Moreover, recent studies on patients with Type II diabetes and hyperlipidemia have shown that ginger can reduce insulin resistance and serum triglyceride concentration(1).

Turmeric (Curcuma longa) is a perennial herb belonging to the ginger family (Zingiberaceae). The main biological activity of turmeric is related to curcumin which has commonly used as curry powder in Asian cuisine. Curcumin has a polyphenol structure and has been traditionally used as a household treatment for various diseases. Several studies suggested that curcumin has antimicrobial, antiinflammatory, antioxidant , immunomodulatory, renoprotective, anti-cancer, hepatoprotective, phypoglycaemic pr operties which are acts through signaling pathways and regulating gene expression.

Although a large body of evidence *in vitro* and animal studies have supported hepatoprotective activity of curcumin, results from single human study have remained inconclusive. Therefore, the present review was aimed at providing a summary and conclusive result for effect of curcumin/turmeric on NAFLD in compare with placebo in adult participants(2).

albumin levels after treatment. However, there was no significant change in liver enzymes (AST and ALT), bilirubin, or INR. Renal function did not show a significant change from baseline. TAC showed a significant increase after treatment (1.612 ± 0.56) relative to the baseline values (1.35 ± 0.05, $P =$ 0.001, Figure Figure1B).1B). Hematological functions varied significantly after 3 months of *N. sativa* treatment. There was a significant increase in RBCs ($P =$ 0.001) and platelets ($P =$ 0.004) and a significant decrease ($P =$ 0.013) in white blood cells.

The liver tissue samples of the 0.2 mL/kg CCl_4 group exhibited remarkable damage. Irregularities were observed in the parenchymal structure, and the classic lobular structure could not be distinguished. In addition, sinusoidal dilation (++), congestion (+), inflammation (++), intense degeneration (+++), vacuolisation, nodular types of cellular damage (+++), pycnotic nuclei of necrotic cells with eosinophilic cytoplasm (+++) and hypertrophic cell structures (+++) were observed. In the recovery group, sinusoidal dilation (+), inflammation (+), congestion (+) and cellular damage (+) were observed. Sinusoidal dilation (+) and congestion (+) were examined in the curative group(3).

The nutritional requirements of honeybees, *Apis mellifera*, are met by the collection of pollen, nectar, and water. Nectar is the primary source of carbohydrates, while pollen provides proteins, lipids, vitamins and minerals. Bee bread (BB) is a fermented mixture of plant pollen, honey, and bee saliva that worker bees use as food for larvae, and for young bees to produce royal jelly. Pollen collected by bees is mixed with a small amount of honey and saliva and packed into the cells of the honeycomb where it undergoes a chemical change to form a product called bee bread. This mixture undergoes different chemical processes due to the action of distinct enzymes from glandular secretions, microorganisms, moisture and temperature (35–36 °C chamber temperature offspring), allowing the transformation, improvement and preservation of the stored pollen, which is called bee bread after two weeks of initial storage.

Despite the role of BB as the main source of protein for bees, its functional properties have been correlated, as well as its flavonoid content, with the BB's floral origin. BB has demonstrated in vitro antibacterial, antioxidant, and antitumor properties. For the last activity, ethanolic extracts were screened against tumor cell lines (human glioblastoma cell line U87MG) and the normal human astroglia cell line SVGp12 (CRL-08621) using in vitro assays.

The BB composition varies according to the origin of the pollen but is mainly composed of water, proteins, carbohydrates, lipids, inorganic elements and various other minor components such as decanoic acid, gamma globulin, nucleic acids, vitamins B and C, pantothenic acid, biopterin, neopterin, acetylcholine, and reproductive hormones, among others.

The quality information available on the literature for beebread remains limited, with few reports on the phenolic composition of this mixture. Some phenolic compounds

were previously identified in BB samples from Poland, Russia, Latvia and Georgia. Other reports on BB samples from Spain and Poland mentioned only total phenolics measured by the Folin-Ciocalteu colorimetric assay and did not provide detailed characterization in terms of individual phenolic compounds.

In the present study, five BB samples, collected from *Apis mellifera* hives located in different apiaries near Guba, in the northeast region of Azerbaijan, and one sample of commercial BB were characterized by HPLC-DAD-ESI/MS in terms of their phenolic profile. Furthermore, the samples were screened against different human tumor cell lines, as well as against non-tumor liver cells(4).

Methods

PubMed, Scopus, Web of Science and Google Scholar were systematically searched until December 2017. We included randomized controlled trials (RCTs) which examined the effect of curcumin/turmeric supplementation on NAFLD in adult participants. Main outcome was alanine aminotransferase (ALT) and aspartate aminotransferase (AST). Potential risks of bias (ROB) were assessed by using Cochrane ROB tool.

Thirty patients with hepatitis C virus (HCV) infection, who were not eligible for IFN/ribavirin therapy, were included in the present study. Inclusion criteria included: patients with HCV with or without cirrhosis, who had a contraindication to IFN-α therapy, or had refused or had a financial constraint to IFN-α therapy. Exclusion criteria included: patients on IFN-α therapy, infection with hepatitis B or hepatitis I virus, hepatocellular carcinoma, other malignancies, major severe illness, or treatment non-compliance. Various parameters, including clinical parameters, complete blood count, liver function, renal function, plasma glucose, total antioxidant capacity (TAC), and polymerase chain reaction, were all assessed at baseline and at the end of the study. Clinical assessments included: hepato and/or splenomegaly, jaundice, palmar erythema, flapping tremors, spider naevi, lower-limb edema, and ascites. *N. sativa* was administered for three successive months at a dose of (450 mg three times daily). Clinical response and incidence of adverse drug reactions were assessed initially, periodically, and at the end of the study.

N. sativa administration significantly improved HCV viral load (380808.7 ± 610937 *vs* 147028.2 ± 475225.6, $P = 0.001$) and TAC (1.35 ± 0.5 *vs* 1.612 ± 0.56, $P = 0.001$). After *N. sativa* administration, the following laboratory parameters improved: total protein (7.1 ± 0.7 *vs* 7.5 ± 0.8, $P = 0.001$), albumin (3.5 ± 0.87 *vs* 3.69 ± 0.91, $P = 0.008$), red blood cell count (4.13 ± 0.9 *vs* 4.3 ± 0.9, $P = 0.001$), and platelet count (167.7 ± 91.2 *vs* 198.5 ± 103, $P = 0.004$). Fasting blood glucose (104.03 ± 43.42 *vs* 92.1 ± 31.34, $P = 0.001$) and postprandial blood glucose (143.67 ± 72.56 *vs* 112.1 ± 42.9, $P = 0.001$) were significantly decreased in both diabetic and non-diabetic HCV patients. Patients with lower-limb edema decreased significantly from baseline compared with after treatment [16 (53.30%) *vs* 7 (23.30%), $P = 0.004$]. Adverse drug reactions were unremarkable except for a few cases of epigastric pain and

hypoglycemia that did not affect patient compliance(5, 6).

Results and Discussion

Mixture with bee products and herbs
Used in Liver Support Therapy.

Ingredients:
Turmeric root,
Ginger root,
Artichoke leaves,
Nigella seed,
Bee Bread,
Thistle honey.

Turmeric Curcuma longa
We have known for centuries the use of curcumin in turmeric to cleanse the liver.
As is known, turmeric regenerates liver cells.
Turmeric helps in removing toxins from the liver.

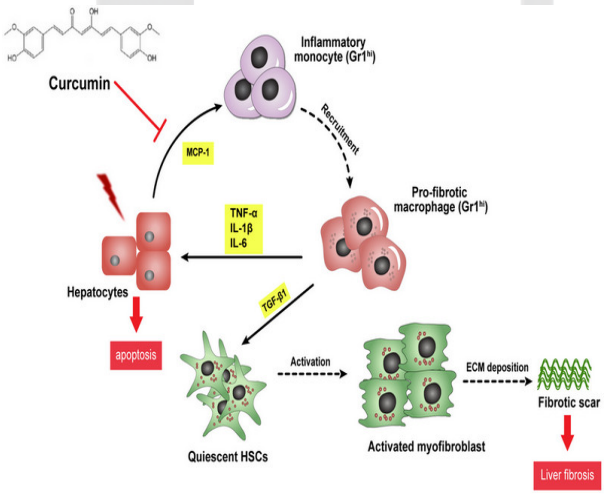

Figure 1.

As Avicenna said:
Consuming turmeric is beneficial for the liver and facilitates digestion.
(The Book of Healing)

Nigella Sativa
Black seed protects the liver from some toxic heavy metals.
Studies have clearly revealed that the black seed solution protects the liver on mice against a toxic substance called carbon tetrachloride.
In addition, it has been stated that toxic substances have less effect on the tissue of the liver(7).

Cynara scolymus
Artichoke has been used for over 2000 years to treat liver and gall bladder ailments, jaundice, in which "eyes and skin turn yellow".
It has been shown that the components found in artichokes, called flavonolignan (also known as cynarin), protect liver cells against alcohol, acetaminophen (Tylenol), and the highly toxic tapeworm fungus(8).

Bee bread
It is a bee product that can be easily dissolved by the body.
It reduces liver enzymes.
Natural Lactic Acid Bacteria and Bifidobacteria in it give it a natural probiotic feature.
Zingiber officinale
Thanks to the antioxidants it contains, ginger reduces triglyceride values and thus helps to reduce liver fat.
It can reduce ALT, AST and GGT levels during steatohepatitis and hepatitis B. Results were available within 12 weeks.
It is effective in basic therapy in non-alcoholic fatty liver disease(4).

Thistle honey
Although thistle honey is an interesting type of honey, it is a very rare honey.
It is common in Azerbaijani districts.
Milk thistle honey, whose active ingredient is Silymarin, creates a synergistic effect with other herbs.
It is easier to absorb the body and its agonist effect with other herbs, like other strained honey.

Effects of Hepbal paste on ALT- one of the liver enzymes

Table 1.

Different groups of liver patients	***Users of Hepbal paste***	***Patients***
Chronic Hepatitis B	31 U/I	62 U/I
Non-alcoholic Steatohepatitis	40 U/I	99 U/I
Alcoholic Hepatitis	113 U/I	208 U/I
Liver Cirrhosis	100 U/I	164 U/I

Number of patients for the study: 44 patients
Period of the study: 8 weeks
The daily dose: 15 kg / mg * 3 times.

Effects on the liver size in case of Steatohepatitis

Table 2

Patients with Liver Lubrication	***Users of Hepbal paste***	***Patients***
Nonalcoholic Steatohepatitis	143 mm grade I	169 mm grade II
Alcoholic Steatohepatitis	155 mm grade II	195 mm grade III

Number of patients for the study: 33 NASH and 36 ASH
Period of the study: 12 weeks
Daily dose: 20 kg / mg * 3 times.

We could get results on these diseases using Hepbal paste:
Hepatitis B, Hepatitis C, NASH, ASH, Cirrhosis.

Other effects of the Hepbal mixture:
Antioxidant effect on toxic hepatitis damaged by long-term chemical therapies
Results due to liver cirrhosis and the lactobacilli which are intestinal disorders (diarrhea-constipation)
Regulation of loss of appetite due to containing flavonoids and minerals

Contraindications:
Active stomach ulcer (bleeding)
Acute intestinal infection
Lower Gastrointestinal bleeding diseases
Organ failure due to Diabetes Mellitus

Using Hepbal paste with medicines:
When it was used with Tenofovir (for Hepatitis B), it took away the side effects of the drug.
It was used with Sofosbuvir, Ledipasvir, Daclatasvir (for Hepatitis C) and positive effects were experienced on ALT and AST.
It caused diarrhea when it was used with Ursodeoxycholic acid.

Goals related to Hepbal paste:
We started research on other liver diseases and cancer with the Japanese scientists.
To start production abroad

To start research together with several countries to highlight the cooperation of Phytotherapy and Apitherapy.
Researching the unknown effects and side effects of bee products to reach conclusions.

Hepbal paste:
It can be considered possible to be used in pregnancy, except for intestinal infections.
Children over 1 year old can use it.
Chronic patients can use it alongside drugs.

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