EXPERIMENTAL STUDY

The effect of intraperitoneal LR-PRP on bacterial translocation in an experimental model of peritonitis in rats

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ABSTRACT

BACKGROUND: This study aims to examine the effect of Leukocyte-Rich Platelet-Rich Plasma (LR-PRP) on bacterial translocation in an experimental peritonitis model in rats. Secondary peritonitis occurs due to the loss of integrity in the mucosal barrier of the gastrointestinal system, resulting from contamination of the peritoneal cavity by microorganisms. LR-PRP has been shown to have positive anti-infectious, immunomodulatory, and angiogenetic effects.

METHODS: Twenty-seven Wistar-Albino rats were divided into three groups: Sham, Control, and Experimental. Laparotomy was performed on the rats under anesthesia, and the cecum was isolated. No procedure was performed on the Sham group. The cecums of the rats in the Control and Experimental groups were punctured twice within 5 minutes using an 18-gauge needle. The blood product of each rat in the Experimental group was prepared for autologous use as LR-PRP and administered intraperitoneally. The abdomens of rats in all groups were closed after 8 minutes. After 8 hours, the rats were sacrificed, and tissue and blood samples were collected. Inflammatory parameters (TNF-α, IL-1, and IL-6) and blood cultures were analyzed from the blood samples. Cultures were also performed on liver, spleen, and mesenteric lymph node tissue samples.

RESULTS: Liver tissue culture growth was not detected in rats in the sham group. It was detected in 6 rats in the control group, and in 1 rat in the experimental group. Mesenteric lymph node tissue culture growth was detected in 2 rats in the sham group, in 7 in the control group and in 1 in the experimental group. Blood culture growth was not detected in rats in the sham group, but detected in 8 rats in the control group, and 3 in the experimental group. In terms of liver tissue culture, mesenteric lymph node tissue culture, and blood culture; a significant relationship was statistically observed between the control and experimental groups (p=0.049, p=0.008, p=0.015, respectively). It was infered that a statistically significant relationship in the mean TNF-alpha, IL-1, IL-6 values was not seen between the control and experimental groups (p=0.999, p=0.999, p=0.590, respectively).

CONCLUSION: LR-PRP's ability to suppress bacterial translocation was statistically significant in liver tissue culture, mesenteric lymph node tissue culture, and blood culture when comparing the Control and Experimental groups. LR-PRP was found to be effective in preventing bacterial translocation without suppressing inflammation and exhibited antimicrobial properties as supported by the literature.

Keywords: Bacterial translocation; intraabdominal sepsis; LR-PRP; peritonitis.

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INTRODUCTION

Sepsis is a systemic syndrome characterized by a life-threatening inflammatory response throughout the body, often resulting in multiple organ dysfunction.[1] It is one of the leading causes of death, particularly in intensive care units. Each year, sepsis affects approximately 30 million people worldwide and causes 6 million deaths.[2]

The gastrointestinal system plays a crucial role in the pathophysiology of sepsis. Intestinal barrier dysfunction-marked by the loss of tissue integrity, epithelial cell death, and the depletion of the mucus layer-triggers the onset of peritonitis symptoms and sepsis.[3]

Given the complexity of sepsis as a syndrome, preclinical research must rely on animal models.[4] The most commonly used models are peritonitis and sepsis models induced by polymicrobial sepsis. The cecal ligation and puncture (CLP) and cecal ligation and incision (CLI) methods are considered the gold standard, as their initiation and progression stages closely resemble the characteristics of human peritonitis and sepsis.[4] Among fecal peritoneal sepsis models, the most frequently used method today is CLP technique described by Wichterman et al. in 1980.[5]

Platelet-Rich Plasma (PRP) is an autologous plasma component obtained by centrifuging whole blood using a centrifuge device, resulting in a higher concentration of platelets compared to whole blood.[6] Normally, plasma consists of approximately 93% erythrocytes, 6% platelets, and 1% leukocytes. In PRP, platelet levels are three to five times higher than those in whole blood. The primary purpose of PRP is to activate the body's natural repair mechanisms. Unlike traditional treatments, its goal is to trigger inflammation rather than suppress it. PRP can be prepared manually or with various FDA-approved preparation kits.[6]

Nowadays, four main types of platelet-rich plasma products and preparation approaches are widely accepted: Pure Platelet-Rich Plasma (P-PRP), Leukocyte-Rich Platelet-Rich Plasma (LR-PRP), Pure Platelet-Rich Fibrin (P-PRF), and Leukocyte-Rich Platelet-Rich Fibrin (L-PRF).[7]

LR-PRP is obtained by centrifuging whole blood using a density gradient, which separates and collects plasma, leukocytes, and platelets from the red blood cells. The buffy coat portion is then mixed with a small amount of plasma to produce the LR-PRP product. LR-PRP contains a higher concentration of white blood cells (WBC) than whole blood.[8]

It remains unclear whether leukocyte-containing PRP has beneficial effects on tissue healing. However, leukocytes in PRP have been shown to possess positive anti-infective, immunomodulatory, and angiogenic effects. Leukocyte-containing PRP has also been found to enhance healing in soft tissue injuries complicated by infection and to inhibit the growth of certain bacteria that cause infections.[9]

Considering these effects, we hypothesized that LR-PRP could be used to prevent bacterial translocation and subsequent mortality and morbidity in peritonitis and intra-abdominal sepsis. In this study, we aimed to investigate the effects of LR-PRP. The originality of this project lies in researching the effect of LR-PRP on bacterial translocation, as no previous study has been conducted on this topic.

MATERIALS AND METHODS

This study was approved by the Ethics Committee of Süleyman Demirel University Animal Experiments Local Ethics Committee with the decision dated February 17, 2022, meeting number 02, and decision number 26. It was supported by the Süleyman Demirel University Scientific Research Projects Coordination Unit under project number TTU-2022-8646.

In our study, a total of 27 Wistar-Albino rats, aged 12 months, weighing between 380 grams and 625 grams, were included. An appropriate number of rats, with each experimental group separated from the others, were housed in standard cages. The rats in the experimental groups were kept in an environment with an average temperature of 22°C, humidity ranging between 55-60%, in a 12-hour day-night cycle. They were fed ad libitum with standard pellet feed and tap water. The care of the rats was conducted in compliance with guidelines set by the National Medical Research Foundation and the Institute of Laboratory Animal Resources. The sample size was identified by conducting a power analysis. According to the G*Power 3.1.9.4 program output used for the power analysis, with an effect size of 0.80, the total sample size required for 3 independent groups was calculated as 21, and the power of the study as 0.863. Since this project involved an experimental peritonitis and sepsis model, and mortality due to sepsis is high, two extra rats were used for each group.

Twenty-seven male Wistar Albino rats, obtained from the Süleyman Demirel University Laboratory of Experimental Animals, were divided into three groups: Sham (n=9), Control (n=9), and Experimental (n=9). All rats underwent abdominal incision and laparotomy under anesthesia. After isolating the cecum, the ileocecal valve was exposed. In the Sham group, the abdomen was closed 8 minutes after being opened, without any additional intervention. In the Control and Experimental groups, the cecum was ligated distal to the ileocecal valve and punctured twice within 5 minutes using an 18-gauge needle on the anti-mesenteric side, following the cecal ligation and puncture procedure. The abdomens of the rats in the Control group were closed 8 minutes after being opened. In the Experimental group, 1.5-2 ml of blood was drawn from the Inferior Vena Cava of each rat for the preparation of LR-PRP. The blood was centrifuged at 830 G for 8 minutes, and the resulting LR-PRP was administered intraperitoneally. The abdomens of the rats in the Experimental group were then closed. After 8 hours, all rats underwent

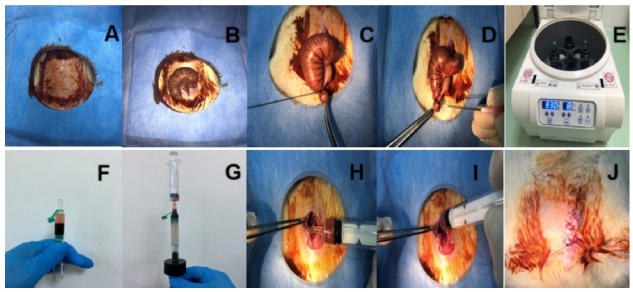

Figure 1. Surgical Procedure **(a)** Rat prepared for surgery, painted with Povidone Iodine and covered with a sterile surgical drape. **(b)** Exteriorization of the cecum from the abdomen, exposing the cecum and ileocecal valve. **(c)** Ligation of the cecum using silk sutures at the distal 2/3 of the ileocecal valve, ensuring mesenteric blood supply is maintained (cecal ligation). **(d)** Puncture procedure after cecal ligation. **(e-f)** Centrifugation of the blood product and separation into three layers. **(g)** Preparation of the LR-PRP solution. **(h-ı)** Application of the LR-PRP solution to the cecum and intraperitoneal cavity. **(j)** Rat with closed abdominal walls and sutured skin.

re-laparotomy under anesthesia. Blood was collected from the Inferior Vena Cava for surgical exsanguination, and tissue and blood samples were collected before the animals were sacrificed. Inflammatory parameters (TNF-α, IL-1, and IL-6) and blood cultures were analyzed from the collected blood samples. Cultures (colony-forming units per gram of tissue) were studied from the liver, spleen, and mesenteric lymph node tissue samples (Figure 1).

Statistical Analysis

Data were transferred to the IBM SPSS.23 (IBM Inc., Chicago, IL, USA) program for statistical analysis. Before conducting statistical analyses, checks were performed to ensure no data entry errors and to verify that the parameters fell within the expected ranges. In descriptive statistics for continuous variables, the mean and the standard deviation, and for categorical variables, the counts (n) and percentages (%) were given. The Chi-square test was used for examining the relationships between categorical variables. Comparisons between two groups were performed using the Mann-Whitney U test. A significance level of $p<0.05$ was applied to all analyses.

RESULTS

Liver Tissue Culture Examination

No bacterial growth was observed in the liver tissue culture of the Sham group, while it was detected in 6 rats in the Control group and 1 rat in the Experimental group (Table 1).

While a significant relationship (p=0.009) was identified between the Sham and Control groups after the statistical analysis of the liver tissue culture, no statistically significant relationship was observed between the Sham and Experimental groups (p=0.229). Moreover, a significant relationship was found between the Control and Experimental groups (p=0.049) (Figure 2).

Spleen Tissue Culture Examination

Bacterial growth was observed in 2 rats in the Control group in the spleen tissue culture, whereas no growth was detected in the Sham or Experimental groups (Table 2).

Statistical analysis showed no significant relationship between the Sham and Control groups (p=0.471). Similarly, no sta-

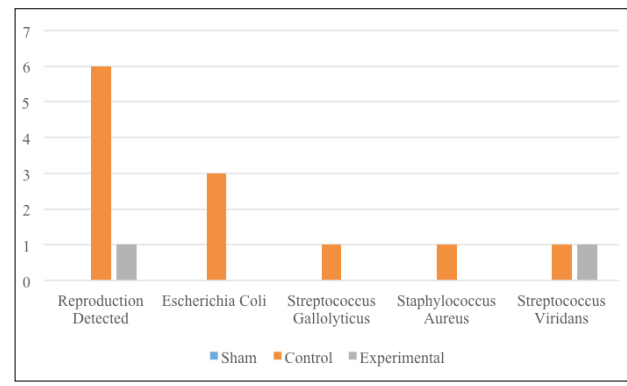

Figure 2. Distribution of liver tissue culture among rat groups.

Table 1. Comparison of Liver Tissue Culture Among Rat Groups

	Sham (n=9)	Control (n=9)	Experimental (n=9)
Liver Tissue Culture		**n (%)**	
Dominant Species Detected			
Number of Subjects with Growth Detected	0	6	1
Escherichia Coli	0 (0,0)	3 (33,3)	0 (0,0)
Streptococcus Gallolyticus	0 (0,0)	1 (11,1)	0 (0,0)
Staphylococcus Aureus	0 (0,0)	1 (11,1)	0 (0,0)
Streptococcus Viridans	0 (0,0)	1 (11,1)	1 (11,1)

Chi-square Test.

Table 2. Comparison of spleen tissue culture among rat groups

	Sham (n=9)	Control (n=9)	Experimental (n=9)
Spleen Tissue Culture		**n (%)**	
Number of Subjects with Growth Detected	0	2	0
Dominant Species			
Escherichia Coli	0 (0.0)	2 (22.2)	0 (0.0)

Chi-square Test.

Table 3. Comparison of mesenteric lymph node tissue culture among rat groups

	Sham (n=9)	Control (n=9)	Experimental (n=9)
Mesenteric Lymph Node Tissue Culture		**n (%)**	
Dominant Species			
Number of Subjects with Growth Detected	2	7	1
Escherichia Coli	2 (22.2)	4 (44.4)	0 (0.0)
Streptococcus Gallolyticus	0 (0.0)	2 (22.2)	1 (11.1)
Staphylococcus Aureus	0 (0.0)	1 (11.1)	0 (0.0)

Chi-square Test.

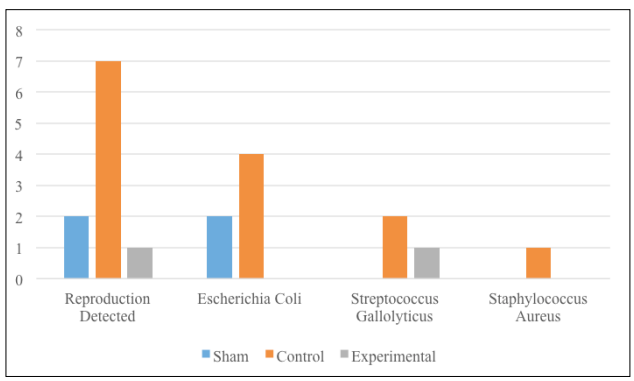

Figure 3. Distribution of mesenteric lymph node tissue culture among rat groups.

tistically significant relationship was identified between the Control and Experimental groups (p=0.471).

Mesenteric Lymph Node Tissue Culture Examination

Bacterial growth was detected in the mesenteric lymph node tissue culture in 2 rats in the Sham group, 7 rats in the Control group, and 1 rat in the Experimental group (Table 3).

While more bacterial growth was observed in the Control group, no statistically significant relationship was found between the Sham and Control groups in mesenteric lymph node tissue culture (p=0.081). Similarly, no significant relationship was observed between the Sham and Experimental groups (p=0.471). However, a significant relationship was identified between the Control and Experimental groups, with a notable decrease in bacterial growth in the Experimental group compared to the Control group (p=0.008) (Figure 3).

Blood Culture Examination

No bacterial growth was detected in the blood cultures of rats in the Sham group. In contrast, bacterial growth was observed in 8 rats in the Control group and 3 rats in the Experimental group (Table 4).

The blood culture examination revealed a statistically significant relationship between the Sham and Control groups due to the marked bacterial growth in the Control group (p<0.001). However, no statistically significant relationship was observed between the Sham and Experimental groups in terms of blood culture (p=0.206). On the other hand, a significant relationship was found between the Control and Experimental groups, with a marked decrease in bacterial growth in the Experimental group compared to the Control group (p=0.015) (Figure 4).

TNF-Alpha Examination

The mean TNF-alpha levels showed no statistically significant differences between the Sham and Control groups (p=0.528),

Table 4. Comparison of blood culture among rat groups

	Sham (n=9)	Control (n=9)	Experimental (n=9)
Blood Culture		**n (%)**	
Dominant Species Detected			
Number of Subjects with Growth Detected	0	8	3
Escherichia Coli	0 (0.0)	5 (55.6)	0 (0.0)
Streptococcus Gallolyticus	0 (0.0)	2 (22.2)	1 (11.1)
Staphylococcus Aureus	0 (0.0)	1 (11.1)	1 (11.1)
Klebsiella pneumoniae	0 (0.0)	0 (0.0)	1 (11.1)

Chi-square Test.

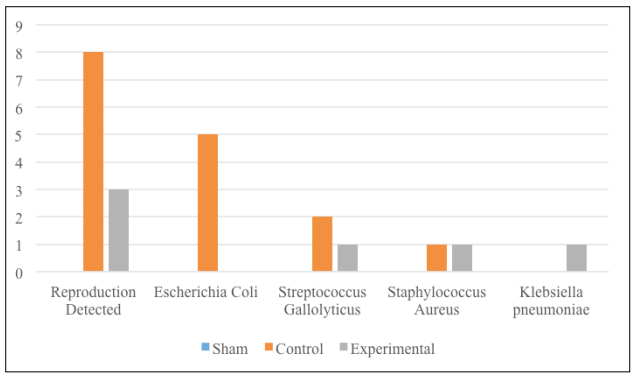

Figure 4. Distribution of blood culture among rat groups.

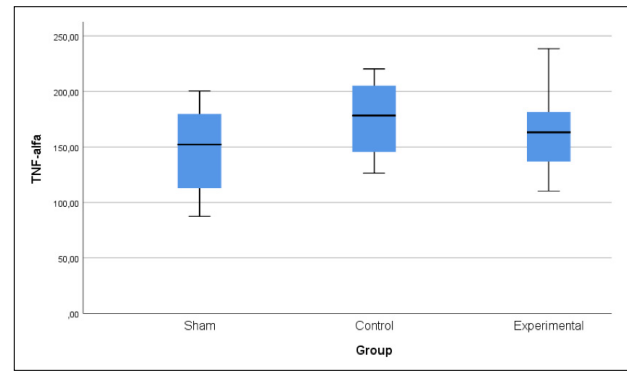

Figure 5. Comparison of tnf-alpha levels among rat groups.

Table 5. Comparison of TNF-alpha levels among rat groups

	Sham (n=9)	Control (n=9)	Experimental (n=9)
		Mean±SD	
TNF-α (ng/L)	148.42±40.19	174.16±34.74	165.46±42.15

Mann Whitney-U Test.

between the Sham and Experimental groups (p=0.999), or between the Control and Experimental groups (p=0.999) (Table 5, Figure 5).

IL-1 Examination

No statistically significant differences were observed in the mean IL-1 levels between the Sham and Control groups (p=0.842), between the Sham and Experimental groups (p=0.873), or between the Control and Experimental groups (p=0.999) (Table 6, Figure 6).

IL-6 Examination

No statistically significant differences were observed in the

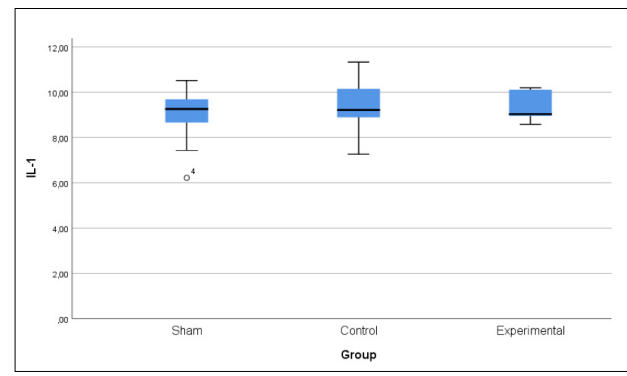

Figure 6. Comparison of IL-1 levels among rat groups.

Table 6. Comparison of IL-1 Levels Among Rat Groups

	Sham	Control	Experimental
		Mean±SD	
IL-1(pg/mL)	8.84±1.31	9.41±1.20	9.40±0.68

Mann Whitney-U Test.

Table 7. Comparison of IL-6 Levels among rat groups

	Sham	Control	Experimental
		Mean±SD	
IL-6 (ng/L)	2.56±0.52	3.56±0.99	2.93±1.31

Mann Whitney-U Test.

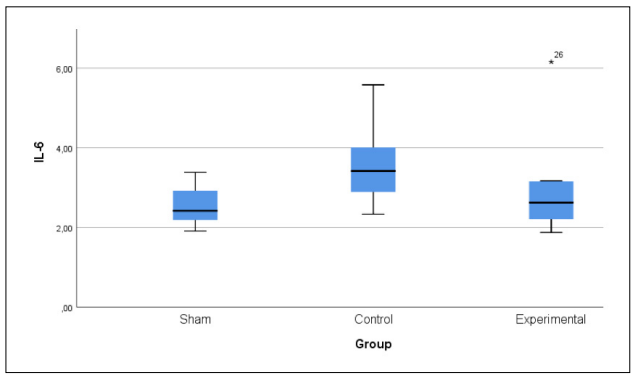

Figure 7. Comparison of IL-6 levels among rat groups.

mean IL-6 levels between the Sham and Control groups (p=0.133), between the Sham and Experimental groups (p=0.999), or between the Control and Experimental groups (p=0.590) (Table 7, Figure 7).

DISCUSSION

In our experimental peritonitis model, created using CLP method in rats, we found that intraperitoneally administered LR-PRP significantly suppressed bacterial translocation. This was evidenced by results from liver tissue culture, mesenteric lymph node tissue culture, and blood culture, without inhibiting inflammation. While the intraperitoneal application of LR-PRP did not show a statistically significant relationship between the Control and Experimental groups in spleen tissue culture, a numerical reduction in bacterial growth was observed.

In the ELISA results obtained from the blood samples, no statistically significant differences were found in the mean levels of the inflammatory markers TNF-alpha, IL-1, and IL-6 between the experimental groups. This indicates that LR-PRP did not suppress inflammation, consistent with findings reported in the literature.

The most commonly used research models for studying sepsis are CLP and cecal ligation and incision models, which are considered gold standard methods.[4] In this study, we used the CLP method to create an experimental peritonitis model that closely mimics human sepsis.

Çakıroğlu et al.[10] prepared PRP by manually centrifuging whole blood at 830 g for 8 minutes, separating it into three distinct layers. Similarly, in our study, we used the same manual method to centrifuge blood obtained from rats at 830 g for 8 minutes, separating the whole blood into three layers. We then combined the upper plasma layer with the buffy coat using specialized devices to obtain the LR-PRP solution.

Spaková et al.[11] reported that the leukocytes in PRP inhibit infectious agents, modulate the immune system, and exhibit angiogenic effects in tissues. Alsousou et al.[12] demonstrated that PRP containing leukocytes enhances healing in soft tissue injuries complicated by infectious agents and inhibits the proliferation of certain bacteria that cause infections. Moojen et al.[13] proposed that leukocytes delivered to a wound via LR-PRP exhibit antimicrobial effects and represent an effective strategy against postoperative infections. In our study, we demonstrated that LR-PRP significantly suppressed and inhibited bacterial translocation in liver tissue culture, mesenteric lymph node tissue culture, and blood culture in our experimental peritonitis model. Additionally, we observed that LR-PRP reduced bacterial growth in spleen tissue culture.

Dragoo et al.[14] suggested that LR-PRP may increase the release of matrix metalloproteinases, activating catabolic pathways of the extracellular matrix and triggering excessive inflammation. Khan et al.[15] demonstrated that the primary mechanism targeted by PRP is to activate the body's repair

mechanisms rather than suppress inflammation, a key principle that distinguishes it from traditional treatments.

In this study, we also found that the mean levels of the inflammatory markers TNF-alpha, IL-1, and IL-6 were not suppressed in the Experimental group following LR-PRP administration when compared to the Sham and Control groups. This aligns with the notion that LR-PRP does not inhibit inflammation but rather supports the body's natural repair processes.

Various studies have reported the antimicrobial activity of platelet products against pathogens such as Staphylococcus aureus,[13,16-17] Escherichia coli, Pseudomonas aeruginosa, Klebsiella pneumoniae,[16] and Enterococcus faecalis.[18]

In two separate studies, Tohidnezhad et al.[19-20] suggested that PRP was effective against Escherichia coli, Bacillus megaterium, Pseudomonas aeruginosa, Enterococcus faecalis, Klebsiella pneumoniae, and Proteus mirabilis, highlighting the antimicrobial efficacy of platelet products. Drago et al.[18] reported that P-PRP inhibited the proliferation of Enterococcus faecalis, Candida albicans, Streptococcus agalactiae, and Streptococcus oralis but was ineffective against Pseudomonas aeruginosa. Similarly, Cieślik-Bielecka et al.[21] demonstrated the in vitro microbicidal effect of LR-PRP against methicillin-resistant Staphylococcus aureus, methicillin-sensitive Staphylococcus aureus, Enterococcus faecalis, and Pseudomonas aeruginosa.

In this study, we aimed to demonstrate the in vivo antimicrobial efficacy of LR-PRP against Escherichia coli, Streptococcus gallolyticus, Staphylococcus aureus, and Streptococcus viridans.

Gotts et al.[22] argued that the main principles of treating secondary peritonitis and intra-abdominal sepsis caused by intra-abdominal infections include adequate fluid resuscitation, empirical antibiotic administration, and control of the septic focus. Marshall et al.,[23] along with Dellinger et al.,[24] highlighted four critical aspects of source control in intra-abdominal sepsis: drainage of purulent cavities, debridement of infected and necrotic tissues, removal of infected devices, and decompression of the abdominal cavity. Intra-abdominal sepsis requires not only systemic treatments but also effective local inflammation control and source control. While local source control methods such as drainage, debridement, and decompression are essential to controlling the infection, our study demonstrated that the intraperitoneal application of an autologous leukocyte- and platelet-rich plasma product effectively inhibited bacterial translocation while promoting tissue healing. Therefore, it is anticipated that intraperitoneal LR-PRP could serve as a local treatment to prevent conditions such as sepsis, which may develop following secondary peritonitis.

Ferrari et al.[25] first applied autologous PRP in 1987 as an autologous transfusion component to reduce blood loss after open-heart surgery. Sampson et al.[26] argued that because PRP is prepared from autologous blood, it does not cause allergic reactions, pose a risk of disease transmission, or promote hyperplasia, carcinogenesis, or tumor growth. In our study, we also did not observe any allergic reactions in the rats in the Experimental group, as the LR-PRP product was prepared autologously from each rat's own blood.

Marx et al.[27] reported that PRP, when prepared with an anticoagulant, can remain stable for up to eight hours or longer, making it suitable for use during extended procedures as needed. This suggests that the application of LR-PRP to the intraperitoneal cavity after completing the procedure in prolonged surgical interventions would not pose a time constraint.

The exact mechanism of LR-PRP's antimicrobial activity is not fully understood, and there are no studies in the literature examining whether a relationship exists between the platelet and leukocyte content of LR-PRP and its antibacterial properties. However, existing evidence suggests that platelets possess multifaceted antimicrobial properties that contribute to host defense.[28-29]

These properties are mediated by numerous antimicrobial oxygen metabolites, including hydrogen peroxide, superoxide, and hydroxyl free radicals, which contribute significantly to the clearance of pathogens from the bloodstream and to antibody-dependent cellular cytotoxicity against microbial pathogens. In addition to these indirect effects, platelets also interact directly with microorganisms.

For years, researchers have worked to isolate platelet-specific antimicrobial molecules from both animal and human platelets to better understand their role in combating microbial pathogens.[30-31]

In the current literature, there is limited information about the structure and function of the antibacterial proteins in platelets. Studies conducted to date have classified the Regulated on Activation, Normal T-cell Expressed and Secreted (RANTES) protein and Platelet Factor 4 (PF4) as key chemokines in bacterial infections caused by intracellular pathogens, which are regulated, expressed, and secreted based on activation. Henriquet et al.[32] and Lei et al.[33] found that RANTES protein levels increased in tuberculosis and Pneumocystis carinii infections, in gastritis associated with Helicobacter pylori infections, and in the cerebrospinal fluid of children with viral and bacterial infections. In the study conducted by Maurer et al.,[34] Platelet Factor 4 was reported to be produced in megakaryocytes and stored in platelet alpha granules. Its main function is to neutralize heparin-like compounds in blood plasma and on endothelial surfaces, reduce the activity of antithrombin III (AT III), and simultaneously exhibit strong antibacterial properties. In this study, we believe that the antimicrobial properties of the LR-PRP produced are attributable to the antimicrobial proteins contained in platelets and the antimicrobial compounds present in leukocytes.

CONCLUSION

Currently, there is no standardized preparation technique for PRP; however, future studies are expected to optimize and standardize PRP products. We believe that with advancements in technology and centrifugation techniques, the autologous LR-PRP application used in this study will become more widely utilized for treating and supporting intra-abdominal infections and secondary peritonitis, one of the most significant causes of sepsis.

This approach offers the potential to manage such infections without exposing patients to significant risks or allergic reactions. Additionally, it is anticipated that LR-PRP will contribute to the prevention of infections in various clinical scenarios due to its antimicrobial properties.

Ethics Committee Approval: This study was approved by the Süleyman Demirel University Animal Experiments Local Ethics Committee (Date: 18.02.2022, Decision No: 26).

Peer-review: Externally peer-reviewed.

Authorship Contributions: Concept: M.H.B., Ö.R.T.; Design: M.H.B.; Supervision: M.H.B., Ö.R.T.; Resource: M.H.B., Ö.R.T., İ.Z.; Materials: M.H.B., M.C.Ş.; Data Collection and/or Processing: M.H.B., Ö.R.T., İ.Z., M.C.Ş.; Analysis and/or Interpretation: M.H.B., Ö.R.T., İ.Z.; Literature Review: M.H.B.; Writing: M.H.B.; Critical Review: Ö.R.T., İ.Z.

Conflict of Interest: None declared.

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DENEYSEL ÇALIŞMA - *ÖZ*

Ratlarda oluşturulan deneysel peritonit modelinde intraperitoneal LR-PRP'nin bakteriyel translokasyona etkisi

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AMAÇ: Bu çalışmanın amacı, ratlarda oluşturulan deneysel peritonit modelinde Lökositten Zengin Trombositten Zengin Plazma'nın (LR-PRP) bakteriyel translokasyona etkisini incelemektir. Sekonder peritonit, gastrointestinal sistemin mukozal bariyerinin bütünlüğünün kaybı ile mikroorganizmaların peritoneal boşluğa kontaminasyonu sonucu oluşan peritonit tablosudur. LR-PRP'nin pozitif anti-enfeksiyöz, immün modülatör ve anjiyogenetik etkileri olduğu gösterilmiştir.

GEREÇ VE YÖNTEM: Wistar-Albino ırkı 27 adet rat, sham, kontrol ve deney grubu olmak üzere 3 gruba ayrıldı. Ratlara anestezi altında laparotomi yapıldı ve çekum izole edildi. Sham grubunda işlem yapılmadı. Kontrol ve deney gruplarındaki ratların çekumları 18 Gauge iğne ile 5 dakika içerisinde 2 kez delindi. Deney grubundaki her ratın kan ürünü kendi üzerinde kullanılmak üzere LR-PRP hazırlandı ve intraperitoneal olarak uygulandı, tüm gruplardaki ratların batınları 8 dakika sonra kapatıldı. 8 saat sonra tüm hayvanlara anestezi altında relaparotomi yapılarak cerrahi egzanguinasyon uygulandı ve doku ve kan örnekleri alındı. Alınan kanlardan inflamatuvar parametreler (TNF-α,IL-1 ve IL-6) ve kan kültürü, alınan karaciğer, dalak ve mezenterik lenf nodu doku örneklerinden ise kültür çalışıldı.

BULGULAR: Sham grubundaki ratlarda karaciğer doku kültürü üremesi saptanmadı, kontrol grubunda 6, deney grubunda 1 ratta üreme saptandı. Sham grubundaki ratların 2'sinde, kontrol grubundakilerin 7'sinde, deney grubundakilerin ise 1'inde mezenter lenf nodu doku kültür üremesi saptandı. Sham grubundaki ratlarda kan kültür üremesi saptanmadı, fakat kontrol grubundaki 8, deney grubundaki 3 ratta saptandı. Karaciğer doku kültürü, mezenter lenf nodu doku kültürü, kan kültürü bakımından; kontrol grupları ve deney grupları arasında istatistiksel olarak anlamlı bir ilişki olduğu gözlendi (sırasıyla p=0.049, p=0.008, p=0.015). Ortalama TNF-alfa, IL-1, IL-6 değerlerinin kontrol ve deney grupları arasında istatistiksel olarak anlamlı bir farklılık göstermediği elde edildi (sırasıyla p=0.999, p=0.999, p=0.590).

SONUÇ: Deneysel peritonit modeli bakteriyel translokasyona yol açtığı, uygulanan LR-PRP'nin, kontrol ve deney grupları karşılaştırıldığında bakteriyel translokasyonu karaciğer ve mezenterik lenf nodu doku kültürü ve kan kültüründe istatistiksel olarak anlamlı ölçüde baskıladığı tespit edildi. LR-PRP; literatürde belirtildiği gibi antimikrobiyal özellikler gösterip inflamasyonu baskılamadan bakteriyel translokasyonu engellemede etkili bulunmuştur.

Anahtar sözcükler: Bakteriyel translokasyon; intraabdominal sepsis; LR-PRP; peritonit.

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