



Wound Coverage in Extensive Necrotizing Fasciitis with Chronic Liver Disease

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Abstract

Keywords

- skin grafting
- thrombocytopenia
- wound debridement
- child-pugh score

Chronic liver disease is characterized by lowered immunity, altered hematological parameters, and poor wound healing. Surgeons may hesitate to intervene in such patients when they present with necrotizing fasciitis (NF) or misinform the patients regarding their chances of survival. This is because of the poor nutritional state, thrombocytopaenia, and abnormal coagulation profile. However, recent guidelines show that platelet count and prothrombin time/international normalized ratio (PT-INR) do not predict postoperative bleeding. We can proceed with debridement followed by skin grafting of wounds in such patients. This will help reduce the high mortality rate of NF in cirrhotic patients.

Introduction

Patients with chronic liver disease (CLD), are at a poor risk for surgical procedures and hence surgeons are hesitant to intervene in cases of necrotizing fasciitis (NF). But surgical debridement is the cornerstone of therapy. Early diagnosis and aggressive intervention without waiting for hematological parameters to improve may help the patients to survive. The present report indicates that in spite of unfavorable hematological parameters in CLD with NF, extensive wounds may be grafted early with reasonable success. This may help reduce mortality and morbidity in these cases.

Case Report

Patient 1

A 64-year-old woman was admitted to our hospital with a history of swelling and discoloration of the left leg for 3 days as shown in ►Fig. 1. She had no significant past history. On admission, she was conscious, oriented, afebrile, tachycardic, normotensive, and mildly dyspneic with spO₂ of 90% on room

air. On evaluation, she showed positive reverse transcriptase–polymerase chain reaction (RT-PCR) for COVID. Her blood investigations revealed pancytopenia with microcytic–hypochromic anemia. Her liver enzymes were not elevated, her prothrombin time/international normalized ratio (PT-INR) was normal, and there was no hyperbilirubinemia. Her ultrasound abdomen revealed coarse echo pattern in the liver parenchyma suggestive of CLD, mild splenomegaly, and moderate ascites. She did not have encephalopathy. Her blood parameters are listed in ►Table 1. Her Child–Pugh class was determined to be B. The reason for her liver cirrhosis was unknown. She underwent wound debridement under spinal anesthesia.

She was dressed with nonadherent silver foam dressings every 3 days. ►Fig. 1 shows the clinical course of the wound during her treatment. She was given remdesivir for the COVID infection. She was given antibiotics, human albumin, parenteral iron, nutritional supplements, ursodeoxycholic acid, amino acids, spironolactone, and potassium supplements. She was transfused with fresh frozen plasma (FFP), packed red blood cells (PRBC), and platelets multiple times

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Fig. 1 Series of images showing the progression of wound of Patient 1 – At time of presentation, post debridement and at time of discharge.

Table 1 Laboratory parameters of patient 1

	Day of admission	Postdebridement day 1	At the time of discharge (23 d since admission)
Total count (cells/mm ³)	4,300	6,200	NA
Hb (g/dL)	9.7	9.0	9.0
PCV (%)	29.2	28	
RBC (million/mm ³)	3.27	3.0	
Platelet (/μL)	62,000	148,000	60,000
PT (s)	17	16.2	16
INR	1.3	NA	1.2
Serum bilirubin (g/dL)	1.4	1.2	3.1
Serum albumin (g/dL)	2.7	3.4	3.0
Wound swab C&S	<i>Staphylococcus intermedius</i>		
Child–Pugh class	B		

Abbreviations: C&S, culture and surface; INR, international normalized ratio; PCV, packed cell volume; PT, prothrombin time; RBC, red blood cell.

throughout her stay, but still her blood parameters did not improve. However, her wound improved to a great extent as seen in ►**Fig. 1** by the end of 23 days. Her platelet counts remained low and serum bilirubin continued to rise. However, we could not proceed with surgery as she and her family refused further treatment. She expired outside the hospital after 2 months of her admission.

Patient 2

A 51-year-old man was admitted to our hospital with a history of debridement for his left leg wound 1 week prior at another hospital. He was a known case of alcoholic liver disease for which he was on medication and had undergone esophageal banding. His abdominal ultrasonography (USG) showed CLD, ascites, and massive splenomegaly. He under-

went debridement of the wound again at our hospital. Then he was treated like the first patient. He did not have encephalopathy. His blood parameters are described in ►**Table 2**. His Child–Pugh class was determined to be B. His hematological parameters too did not improve despite multiple transfusions probably due to hypersplenism. We took him up for skin grafting 20 days after his first debridement despite his poor hematological parameters (Hb: 8.5 g%; platelet: 51,000/μL) with intraoperative platelet transfusions (100 mL of single donor platelets). He had cerebrovascular accident (CVA) on postoperative day 2. His computed tomography (CT) of the brain showed small vessel ischemic changes in the frontotemporal subcortical white matter and periventricular regions. The skin graft took well with complete healing of the wounds as seen

Table 2 Laboratory parameters of patient 2

	Day of admission	Postdebridement day 1	At the time of skin grafting	At the time of discharge
Total count (cells/mm ³)	3,400	2,000	3,700	4,800
Hb (g/dL)	8.2	9.9	8.6	10.2
PCV (%)	25	30	25	31
RBC (million/mm ³)	2.5	3.1	2.7	NA
Platelet (/μL)	156,000	117,000	51,000	86,000
PT (s)	18	NA	NA	NA
INR	1.4	NA	NA	NA
Serum bilirubin (g/dL)	2.0	NA	1.0	1.5
Serum albumin (g/dL)	3.0	NA	3.1	2.8
Wound swab C&S	No growth	NA	NA	NA
Child–Pugh class	B			

Abbreviations: C&S, culture and surface; INR, international normalized ratio; PCV, packed cell volume; PT, prothrombin time; RBC, red blood cell.



Fig. 2 Series of images showing the progression of wound of Patient 2 – At time of presentation, post debridement, before skin grafting and at time of discharge.

in ▶**Fig. 2**. His stroke symptoms of left-sided hemiparesis improved with physiotherapy.

Discussion

In CLD, the patient is in a state of hypermetabolism and malnutrition.¹ Secondary hypersplenism is a known complication of cirrhotic liver disease with portal hypertension. It leads to premature destruction of RBCs and platelets giving us the blood picture of anemia and thrombocytopenia. A review article by Wilde and Katsounas² cited multiple studies showing the reduction in helper T cells along with their

dysfunction in liver disease. Further, the “leaky gut” phenomenon leads to a higher chance of bacteremia. There is dysregulation of lipopolysaccharides (LPS) specific toll-like receptor (TLR) dependent immunity. All these lead to lowering of the immune status in patients with CLD, leading to increased susceptibility and severity of infections. Ultimately, the patient’s wound healing ability is compromised in liver disease.

Most standard textbooks of surgery mention the following systemic factors as an impediment to wound healing: age, obesity, chronic diseases, immunosuppression, anemia, thyroid disorders, hypoalbuminemia, and malnutrition. Our

two patients had almost all these factors. Especially prominent was their anemia, thrombocytopenia, and liver disease.

There are very few studies in the literature on the topic of skin grafting for large wounds in patients with liver disease. However, both the American Gastroenterological Association and the European Association for the Study of the Liver (EASL) have reported that platelet count and PT-INR levels are not predictive of postoperative bleeding in cirrhotic patients and are therefore not recommended.^{3,4} Further, the EASL guidelines state that platelet count threshold of 50,000/ μ L before invasive procedures is not recommended and even lower levels are not a contraindication to surgery. A few studies showed that skin graft take does not reduce in normovolemic anemia.^{5,6} Therefore, we proceeded with grafting of wounds despite the patient being anemic in our second patient. His skin graft take was excellent at almost 95%.

Conclusion

Early skin grafting of wounds, without waiting for hematological parameters to normalize, should be attempted. This may reduce the chances of wound infection, sepsis, and blood loss due to repeated dressing change. Hence, early wound resurfacing even in the presence of hematological

problems in cases of extensive NF with CLD may reduce mortality.

Conflict of Interest

None declared.

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