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Telemedicine in alcohol liver disease and transplantation care: Addiction therapy through video-conferencing—A case report

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Abstract

Alcohol use disorder is a major public health concern, contributing to significant morbidity and mortality worldwide. Alcohol-associated liver disease is a major consequence of alcohol use disorder, with liver transplantation becoming the leading indication for this condition. This abstract describes a case study of a 39-year-old Native American man with severe alcohol-associated liver disease, illustrating the challenges and solutions in providing comprehensive care in a remote location. The patient's treatment involved a multidisciplinary approach, combining hepatology, addiction therapy, and telemedicine services. Despite initial difficulties, the patient achieved complete abstinence and significant improvement in liver function, avoiding the need for transplantation. This case highlights the importance of interdisciplinary care and the potential of telemedicine for managing complex cases of alcohol-associated liver disease and alcohol use disorder in remote areas, ultimately improving patient outcomes and reducing healthcare burdens.

Keywords

Alcohol-associated liver disease, alcohol use disorder, video-conferencing technology, liver transplant, rural health

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Introduction

Alcohol use disorder (AUD) is defined by the Diagnostic and Statistical Manual of Mental Disorders, fifth edition as a pattern of harmful alcohol use that continues despite negative social and health effects.[1] AUD is responsible for nearly 3 million deaths annually, translating to over 5% of deaths worldwide.[2] In 2016, alcohol was the seventh leading cause of death and disability-adjusted life-years globally, which accounted for 2.2% and 6.8% of age-standardized female and male deaths, respectively.[3] Although excessive alcohol consumption can affect multiple body organs, its effect on the liver, resulting in alcohol-associated liver disease (ALD), contributes significantly to morbidity and mortality associated with AUD.[3] ALD constitutes a broad category of liver injuries, which range from asymptomatic laboratory abnormalities with steatosis and steatohepatitis to advanced liver disease with cirrhosis and alcoholic hepatitis (AH) with multi-organ failure in its most severe form. ALD accounts for roughly 30% of the world's 1.32 million cirrhosis-related fatalities and over 25% of all cirrhosis-related deaths in the United States (US).[4] Notably, liver transplantation (LT) for ALD has consistently increased over time, especially since the availability of effective drugs for hepatitis C virus infection during the last decade. Since 2017, ALD is the leading indication for LT in the US.[5] The healthcare burden from ALD has further perpetuated during and after the COVID-19 pandemic.[6]

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Illustrative case

A 39-years old Native American (NA) man, with history of excessive alcohol consumption (⩾2 hard liquor drinks/day for 15–20 years) and without known chronic liver disease, was transferred to Avera McKennan Hospital in Sioux Falls from the Cheyenne River Indian Reservation within South Dakota (SD) with jaundice and liver failure, suspicious for severe AH. Patient's most recent alcohol consumption was approximately 2 weeks earlier. His physical exam revealed stigmata of liver disease, including jaundice, abdominal ascites, generalized edema, and lethargy with asterixis. Liver was enlarged and he was tender in the right upper quadrant. Initial laboratory tests showed total serum bilirubin of 31.4 mg/dl, aspartate aminotransferase of 129 IU/l; serum albumin of 2.2 g/dl; alanine aminotransferase of 27 IU/l; and alkaline phosphatase of 53 IU/l. Biochemical studies also revealed a serum sodium (Na) of 130 mEq/l, serum creatinine (Cr) of 1.4 mg/dl, and prothrombin time of 29.6 s with international normalized ratio (INR) of 2.9. Complete blood count revealed white blood cell count of 13,400 cells/µl, hemoglobin of 8.6 g/dl, and platelet count of 175 K/µl. The Maddrey discriminant function was 63.5, and model for end-stage disease-sodium (MELD-Na) score was 32, both indicating severe AH (estimated 90-day mortality risk of 65%) and the need for corticosteroid therapy. However, this was not instituted due to acute kidney injury (AKI).

Doppler ultrasound of the liver showed a coarse, nodular liver with a non-occlusive portal vein thrombosis, with normal intra and extra-hepatic biliary ducts. Contrast-enhanced, abdominal magnetic resonance imaging of the liver confirmed the ultrasound findings and revealed hepatomegaly with mild hepatic steatosis and sequelae of portal hypertension, including splenomegaly, abdominal ascites, and no arterial-enhancing focal liver lesion. An esophagogastroduodenoscopy showed small (<5 mm) esophageal varices and portal hypertensive gastropathy. Urine routine, microscopic examination, and renal ultrasound performed to assess AKI did not reveal intrinsic or post-renal pathology. Serological workup for other causes of liver disease was negative. Infectious workup (clinical examination, chest X-ray, ascitic fluid analysis, and blood and urine cultures) was negative for infection.

Hepatology and transplant team managed the patient jointly with a clinical diagnosis of severe AH on underlying alcohol-associated liver cirrhosis. Management over 3 weeks of hospitalization included treatment of hepatic encephalopathy treated with oral lactulose and rifaximin; rotational thromboelastometry guided transfusion of blood and products for gastrointestinal hemorrhage and anemia; and volume expansion with intravenous 25% albumin, oral midodrine, and subcutaneous octreotide for AKI due to hepatorenal syndrome. However, the liver disease progressed during the first week with a peak serum bilirubin of 40.6 mg/dl and serum Cr of 4.0 mg/dl, with MELD-Na above 40. Hence, a comprehensive multidisciplinary evaluation was performed for combined liver-kidney transplantation. The patient was a favorable candidate from a medical and surgical standpoint. With a moderate risk for alcohol relapse after LT, as per detailed evaluation by addiction team, a decision was made that he should receive treatment for AUD and adhere to it before listing him for LT.

A chemical dependency assessment was completed by our team's Licensed Addiction Counselor (LAC) and social worker during the inpatient hospital admission. It included a comprehensive biopsychosocial evaluation utilizing the American Society of Addiction Medicine criteria, which deemed his required level of care at 3.7—inpatient addiction treatment. Patient's therapy sessions with the LAC started during the hospital stay before he was directly discharged to the addiction treatment center for 28 days of intensive inpatient treatment, which included a minimum of 30 h per week delivered through a combination of individual and group sessions. While group therapy addressed general concepts in addiction, recovery, and mental health across all participants, individualized therapy was patient-centered and focused on issues specific to him. Evidenced-based practices were utilized during both individual and group treatment sessions, including psychoeducation, motivational interviewing, and cognitive behavioral therapy. Simultaneously, an integral component is family programming, wherein the patient was purposefully encouraged to stay connected with his significant other through in-person and virtual visitation.

After completing the inpatient addiction treatment, the patient was discharged home to Eagle Butte, a city in Dewey and Ziebach counties in SD (44°59′47″N 101°14′9″W) on the Cheyenne River Indian Reservation wherein 42.5% of the population is under the poverty line and 29.5% are without health care coverage which is striking in comparison to the rest of the state (12.3% and 9.5%, respectively).[7] While medical clinics, the US Public Health Service, and the Indian Health Service hospital serve the city's population of ~1200 people, there is lack of specialized healthcare, much less comprehensive LT care with integrated addiction therapy. As this town is almost 5 h away, it was difficult for him to come regularly to attend intensive outpatient sessions with the LAC. To achieve this, remote virtual sessions from his home were conducted using an iPad issued to the patient by the hospital. The iPad was specifically programmed to utilize wireless, cellular internet services only for its intended purpose if Wi-Fi was unavailable.

Initially for the first month, LAC conducted biweekly, 45-min long virtual sessions which changed to bimonthly for the next 3 months. A synchronized approach between the LT clinical coordinator nurse and the addiction counselor successfully completed the required intensive outpatient addiction therapy for our patient. He stayed adherent to treatment sessions and remained sober throughout the whole period. Thereafter, the time between sessions

lengthened gradually over following 6 months as the patient became more stable in his recovery process. The patient participated in in-person counseling sessions in Sioux Falls scheduled alongside his follow-up transplant hepatology appointments.

Currently, 40 months since his index hospitalization, our patient remains completely abstinent without a single slip and has been taken off the LT waitlist as his liver disease has significantly improved to a current MELD-Na score of 12 (serum bilirubin 0.5 mg/dl, Cr 1.6 mg/dl, Na 140 mEq/l, and INR 1.1).

Discussion

Patients diagnosed with ALD have a greater chance of recovery and survival with strict alcohol abstinence. Sustenance of treatment is critical for long-term abstinence, which can be achieved at the patient level by supporting innovative healthcare delivery platforms that treat ALD and AUD. Management of ALD and AUD depends on complete abstinence from alcohol consumption, support of friends and family members, and access to alcohol addiction recovery therapies. Management of ALD due to AUD can be extremely challenging in remote or rural areas. Several hurdles exist due to limited access to healthcare services, transportation difficulties, stigma related to addiction in the small community, cultural and language barriers, limited resources related to funding and workforce shortages, lack of social support, scarce technology and knowledge, and limited access to addiction therapies. As in the illustrated case, an integrated care model with multidisciplinary approach is ideal and essential to overcome presenting barriers.[8] Coordinated synchronized health advocacy by expert professionals within the field of transplantation medicine and addiction therapy with utilization of advanced telemedicine tools is critical.

Behavioral health services are sparse in rural areas, and travel time and expense to distant ones further burdens ailing patients.[9] Dual pathology—AUD and ALD—necessitates interdisciplinary treatment directed by addiction specialists and hepatology, respectively, regardless of the need for transplantation. Such care models have been shown to reduce the incidence of alcohol relapse in ALD patients within and outside of LT setting.[10–13] Accessibility to such interdisciplinary teams is very limited in remote/rural areas.

In the context of our study, our patient was exceptionally adherent with all the remote treatment instructions. Regular check-ins through messages with LAC played a critical role in maintaining our patient's adherence. The patient was educated on how incremental improvement in mental health with addiction therapy was effective and successful toward long-term health outcomes. This approach served as a significant factor, encouraging our patients for continued adherence to the adopted management strategy. Additionally, consistent communication between our patient and his primary care team, which included LAC, transplant coordinators, and physicians reinforced his commitment to the treatment.

Technological advancements such as the widespread availability of smartphones and digital tablets with fairly economical satellite (Starlink) broadband internet in geographic locations with sparse wireless internet have the potential to facilitate interdisciplinary therapies to patients residing in remote areas of the US. Plus, besides maintaining patient confidentiality and avoiding stigmatization, particularly in small rural communities, Baca et al.[9] found equal satisfaction in patients who received tele-counseling in comparison to in-person, face-to-face mode and its capability to produce viable results. This said, some patients may be reluctant to virtual care and/or may find using digital technology cumbersome. Also, licensure requisites across state lines may limit tele-counseling services to remote patients within the state.

Conclusion

Alcohol abstinence and medical adherence, at large, depend on sustaining therapy, which can be circumstantially arduous. Specialized healthcare, inclusive of solid-organ transplantation medicine and addiction therapy, is scant in rural US and specifically lacking in some remote NA reservations of the country. Development and application of novel strategies using tele-digital platforms for integration of addiction treatment and behavioral therapy in comprehensive LT care is feasible and has the potential to augment medical adherence and reduce alcohol relapse.

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Author contribution statement

Sujit Vijay Sakpal: conceptualized and carried out literature review, manuscript writing, and editing the draft. Malia J Holbeck: conceptualized and carried out literature review, manuscript writing, and editing the draft. Ann Wade: manuscript writing, editing the draft. Kushagra Singh: conceptualized and carried out literature review, manuscript writing, and editing the draft. Ashwani K Singal: manuscript writing, editing the draft. All authors approved the final manuscript version and ensured integrity and accuracy of the work.

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Informed consent

Written informed consent was obtained from the patient(s) for their anonymized information to be published in this article.

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