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Communication

A Call for Implementation of an Evidence-Based, Quality Improvement, Decompensated Cirrhosis Discharge Care Bundle in Australia

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Abstract: A growing body of research suggests that evidence-based interventions can tackle high rates of hospital readmissions among patients with decompensated cirrhosis. Care bundles are a prime example of an evidence-based intervention to reduce hospital readmissions through documentation and communication. In this pilot study, a comprehensive baseline audit of electronic medical records of 497 discharges for 175 patients was conducted to assess the current standards of care on discharge from Blacktown Hospital, Australia, and the scope for introducing a care bundle. Our results demonstrated suboptimal discharge communication in a number of areas: Only 54% of decompensated cirrhosis patients had a follow-up appointment pre-scheduled at discharge. Despite alcohol being identified as a key cause of cirrhosis in 60% of patients, a review by alcohol services was conducted on only 24.9% of patients. Moreover, a general lack of focus on patient education and health literacy was identified. In conclusion, our pilot study has highlighted areas for improvement in the standard of care provided to this cohort of patients. Implementation of a standardized care bundle could address the current shortfalls, improve the standard of care and refocus discharge planning to address health literacy and education in patients admitted with a decompensated liver.

Keywords: decompensated cirrhosis; discharge; care bundle; quality improvement; continuity of care; clinical practice; standardization; readmissions

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1. Introduction

Liver cirrhosis is a widespread condition with a progressive, highly morbid and often fatal outcome. It is an ever-growing public health problem in Australia due to alcohol-related liver disease (ALD), chronic hepatitis B (HBV) and hepatitis C virus (HCV) infections and metabolic associated fatty liver disease (MAFLD). Liver disease is now considered the 11th leading cause of premature death in Australia according to AIHW [1]. Acute decompensation of chronic liver disease (CLD) is a common cause of emergency department (ED) presentation, resulting from unmet needs that have presented due to the multifaceted nature of CLD. This can lead to prolonged hospital admission, impaired quality of life, significant management challenges and considerable risk of in-hospital mortality [2,3]. Indeed, common features of decompensation include jaundice, hepatic encephalopathy, coagulopathy, ascites, acute kidney injury and gastrointestinal bleeding [4]. Patients with acute-on-chronic hepatic decompensation of their liver cirrhosis and organ failure are considered to have acute-on-chronic liver failure (ACLF), which carries a high mortality rate in excess of 15% at 28 days [5–7].

Despite the disparity in data, hospital readmission is common following discharge in patients with decompensated cirrhosis [8,9]. Early readmission may reflect poor quality of patient care and is an independent predictor of mortality [10–12]. Factors that contribute to early readmission include poor discharge medication reconciliation, premature discharge, non-engagement by patients, lack of communication with outpatient medical teams regarding other comorbidities and lack of decompensated cirrhosis-specific patient education. The implementation of evidence-based interventions on discharge is needed to decrease early readmissions among decompensated cirrhosis patients and reduce the burden on healthcare resources. A growing body of evidence supports that both pharmacological and non-pharmacological interventions can reduce the risk of decompensation in patients with cirrhosis [13,14]. Nevertheless, once a patient is discharged from hospital, a specific treatment plan to reduce the risk of ED representations, future decompensation events or disease-related comorbidities is not routinely delivered. Despite the availability of such treatments and clinical practice resources in Australia, there is a lack of consensus regarding the benefit and utilization of discharge bundles that should be implemented to reduce readmissions.

An example of an evidence-based strategy to reduce hospital readmission following discharge of patients with decompensated cirrhosis is the use of care bundles. Bundles prompt staff to follow standardized care on discharge and limit the likelihood of emergency readmission for treatments such as paracentesis that would otherwise be scheduled [15]. Care bundles are structured ways of improving the processes of discharge communication and documentation based on a set of defined actions contributing to the achievement of a precisely specified aim [16]. In principle, appropriately implemented protocol-based care bundles should enable teams to improve the quality of their discharge with the ultimate target of improving long-term outcomes and reducing hospital readmissions. Preliminary data support the efficacy of implemented decompensated cirrhosis discharge bundle (DCDB) in the UK [17]. Notwithstanding the very low completion rates and small size of the cohort in another study conducted, the implementation of DCDB improved some aspects of care, particularly monitoring post-discharge renal function, alcohol misuse management and documentation [18].

Here we report the findings of a retrospective audit of all patients presenting to Blacktown Hospital with decompensated liver cirrhosis over a three-year time frame. An assessment of the current quality of documentation and communication upon discharge acts as a baseline for the future implementation of a discharge bundle. The subsequent use of a discharge bundle in compliance with current guidelines will attempt to reduce variation in care, quantify the future impact of a care bundle on patient outcomes and improve compliance with national and international guidelines.

2. Materials and Methods

2.1. Patient Cohort and Auditing

Patients discharged from the gastroenterology department at Blacktown Hospital (Blacktown, NSW, Australia) between January 2018 and December 2021 were assessed for inclusion in this study. A comprehensive retrospective review of electronic medical records including discharge letters was completed for 175 patients discharged. Patients were identified using ICD-10 coding (K70.3, K75.8, B18.2, C22.0, B18.1) (Table 1). Medical notes were used to identify the current quality of care on discharge including management of ascites, varices, electrolyte monitoring, alcohol misuse and medication reconciliation. Patients were included if they had known cirrhosis or suspected cirrhosis and were admitted for hepatic decompensation. Our audit assessed quality compliance with the care improvement domains of the decompensated cirrhosis discharge bundle endorsed by the British Society of Gastroenterology (BSG) [19].

Table 1. Etiology of Liver disease.

ICD-10 Code	N	Percent %
K70.3 Alcoholic cirrhosis of liver	299	60.2
K75.8 Non-alcoholic steatohepatitis	72	14.5
B18.2 Chronic viral hepatitis C	47	9.5
C22.0 Hepatocellular carcinoma	21	4.2
B18.1 Chronic viral hepatitis B	12	2.4
Other	46	9.2
Total	497	100

2.2. Statistical Analysis

All statistical analyses were performed using IBM SPSS software version 28.0.1 (SPSS Inc., Chicago, IL, USA). Data presented in frequency and percentage. Variables were summarized as median and per cent.

3. Results

Description of the Cohort

In total, data were collected from 497 discharges of 175 patients between January 2018 and December 2021. Overall, 66% of the cohort were male with a median age of 60 years (range 33–92).

ALD was the most common aetiology of liver disease, accounting for 60.2% of patients (Table 1). There was significant variability in the quality of the discharge documentation, with no documented cause of decompensation in 36.4% of discharges (Table 2). The median model for end-stage liver disease (MELD) scores at 48 h prior to discharge and on discharge day were 16 (range 6–38) and 16 (range 6–37), respectively, whereas Child–Pugh scores were 9 (range 5–19). The overall in-hospital mortality rate was 9% with a median length of stay of 5 days. Overall, 65 patients (37%) were readmitted within 30 days of discharge.

Table 2. Causes of decompensation.

ICD-10 Code	N	Percent %
G94.3 Hepatic encephalopathy	80	16.1
I85.0 Esophageal variceal bleeding	70	14.1
R18.0 Ascites	40	8.0
K76.7 Hepatorenal syndrome	12	2.4
Other	114	22.9
Undetermined	181	36.4
Total	497	100

Tables 3 and S1 show the results of the baseline audit of Blacktown Hospital (Blacktown, NSW, Australia). Approximately 54% of patients had a follow-up appointment pre-scheduled at discharge. Our audit demonstrated relatively low levels of active management of alcohol misuse with only 24.9% of patients reviewed by in-hospital alcohol teams. Moreover, there was a remarkable lack of continuity of care post-discharge. Among discharged patients, 22.3% had been followed up by community services and only 4.6% were referred to external agencies and organizations that offer alcohol support, counselling and information. Most patients presenting with hepatic encephalopathy were managed by treatment with either lactulose or rifaximin, or both.

Table 3. Audit results from Blacktown Hospital.

	N	Percentage (%)
Follow up post-discharge		
No follow-up appointment scheduled	227	(45.6%)
Follow-up appointment scheduled	270	(54.3%)
Alcohol misuse		
Alcohol consumption	239	(48.1%)
Community follow up	111	(22.3%)
Thiamine prescribed	307	(61.7%)
Post-discharge referral to external agency	23	(4.6%)
Reviewed by hospital alcohol team	124	(24.9%)
Hepatic encephalopathy (HE) management		
HE present	216	(43.5%)
Lactulose prescribed	309	(62.2%)
Rifaximin prescribed	201	(40.4%)
Both Lactulose and Rifaximin prescribed	183	(36.8%)
Ascites management		
Diuretics prescribed	365	(73.4%)
Spironolactone	232	(46.7%)
Furosemide	126	(25.4%)
Hydrochlorothiazide	5	(1.0%)
Amiloride	2	(0.4%)
Weight reported on discharge letter	419	(84.3%)
Paracentesis performed before discharge	221	(44.4%)
Paracentesis predicted interval not reported	109	(21.9%)
Paracentesis scheduled at Western Sydney Local Health District (WSLHD)	98	(19.7%)
Spontaneous bacterial peritonitis (SBP)		
History of SBP	144	(29.0%)
Cotrimoxazole prescribed	22	(4.4%)
Identified SPB organism		
Escherichia coli		8.5%
Viridans streptococci		1.9%
Staphylococcus aureus		1.3%
Others		4.1%
Unidentified organism		84.2%
Varices		
Esophageal varices	149	(29.4%)
Gastric varices	19	(3.8%)
Grade of varices		

Table 3. *Cont.*

	N	Percentage (%)
I	46	(9.3%)
II	53	(10.7%)
III	39	(7.8%)
IV	3	(0.6%)
Presence of red wale sign	33	(6.6%)
Primary prophylaxis of portal hypertension		
Beta blockers prescribed	170	(34.2%)
Beta blockers not prescribed	323	(64.9%)
Amiloride	106	(21.3%)
Spironolactone	38	(7.6%)
Torsemide	18	(3.6%)
Esophageal varices	149	(29.4%)
Esophageal varices -ligation performed	77	(15.5%)
Repeat esophagogastroscopy	58	(11.6%)
Repeat EGD not performed	439	(88.3%)
Repeat EDG interval (4 weeks)	14	(2.8%)
Reasons for lack of primary prophylaxis		
Prophylaxis performed at another hospital	3	(0.6%)
Prophylaxis previously performed	75	(15.1%)
Nil mentioned	419	(84.3%)
Secondary prophylaxis of portal hypertension		
Beta blocker prescribed	156	(31.3%)
Repeat EGD for ligation	67	(13.4%)
Renal function		
Reporting Creatinine, Sodium (Na), Potassium (K) levels in discharge letter	450	(90.5%)
Frequency of Urea and Electrolytes(U&Es) in discharge letters—not reported	46	(9.25%)
Diuretics reduction		
General practitioner	39	(7.84%)
Specialist	10	(2.0%)
Unknown	1	(0.2%)
Unapplicable	44	(8.85%)
Not to reduce	403	(81.0%)
Pre-discharge Investigations		
Coagulation profile (Coags)	488	(98.1%)
Liver function tests (LFTs)	494	(99.3%)
Electrolytes, urea, creatinine (EUC)	494	(99.3%)
Full blood count (FBC)	494	(99.3%)
Alpha feto protein (AFP)	111	(22.33%)

Table 3. *Cont.*

	N	Percentage (%)
Treatment		
Present escalation and emergency plans	76	(15.2%)
Palliative care reported in discharge letter	21	(4.2%)
Palliative care referral	25	(5.0%)
Liver transplant referral	37	(7.4%)
Referral for Transjugular intrahepatic portosystemic stent-shunt (TIPSS) (per admission)	73	(14.6%)
Qualified for TIPSS (per admission)	106	(21.3%)
Patient Education		
Diagnosis was explained	6	(1.2%)
Importance of alcohol abstinence (if applicable)	3	(0.6%)
Explained current medications	3	(0.6%)
Handing leaflets about cirrhosis	0	(0.0%)

Of the patients with ascites, 73.4% were treated with diuretics such as spironolactone (46.7%), furosemide (25.4%), hydrochlorothiazide (1.0%) and amiloride (0.4%). A total of 44.4% received paracentesis before discharge. Interestingly, only 21% of discharge letters addressed paracentesis intervals post-hospitalization.

Despite the use of sensitive methods, ascites culture was negative in as many as 84.2% of patients with clinical manifestations suggestive of spontaneous bacterial peritonitis (SBP). Upon diagnosis, broad-spectrum antibiotics should be empirically used for SBP treatment according to hospital policy, with revisions made considering subsequent culture results. Our results show primary and secondary SBP prophylaxis with co-trimoxazole was relatively low, with cotrimoxazole only prescribed in 22 presentations.

Bleeding varices are an important complication of cirrhosis with a high mortality rate. In the presence of moderate/large varices or small varices with severe liver dysfunction, non-selective β-blockers (NSSB) are typically the therapy of first choice. Endoscopic banding is usually reserved for patients with contraindications to NSSB. Generally, NSSB are safe and effective for primary and secondary prevention of portal hypertension [20]. Ongoing treatment with NSBB post-discharge is common and reduces mortality. However, our results disappointingly demonstrated that NSBB were only prescribed in 36.1% of the cohort.

Acute kidney injury (AKI) is estimated to occur in under a quarter of hospitalized patients with cirrhosis and is associated with a poor prognosis [21]. Our audit identified uncertainty in delineating whether it is the role of the specialists or primary carers to titrate diuretics post-discharge. Furthermore, our data show serum alpha-fetoprotein (AFP) has not been widely used as a serological marker despite international guidelines for HCC surveillance recommending AFP.

Our audit also demonstrated poor reporting of post-hospitalization treatment escalation plans (15.2%) and a general lack of enthusiasm to refer patients for transjugular intrahepatic portosystemic stent-shunt (TIPSS) surgery. Lastly, patient education was almost absent from current standards of care.

4. Discussion

A summary of the baseline care on discharge in our cohort has identified the areas for improvement in current care at Blacktown Hospital. Standardization of care is needed to ensure the discharge of decompensated cirrhosis patients is in accordance with evidence-

based national and internal guidelines. Given the most common aetiology of liver disease in our cohort was alcohol, with approximately 60% of patients identified, methods to ensure review by alcohol teams and community follow-up should be prioritized. Similarly, 44% of patients presenting with ascites had an inpatient paracentesis with only 19% receiving a scheduled follow-up outpatient paracentesis appointment on discharge. This highlights the potential for preventable readmission of those with no follow-up, who may require emergency paracentesis. High incidence of poor adherence to treatment, perceived low motivation and underlying substance and alcohol misuse in some patients with cirrhosis are all factors that contribute to early readmissions and should not be ignored.

Moreover, our results highlight the lack of focus on patient education and health literacy among patients discharged after an episode of hepatic decompensation. Despite significant advances in our knowledge of how to diagnose and treat chronic liver disease, the rise in the global burden of liver disease demands effective strategies to address the unmet educational needs of decompensated liver cirrhosis patients in hospital settings. Education is a core clinical competency for delivering an effective care plan. Patient education will ultimately lead to decreased hospitalizations and resource utilization. Educational programs should be tailored to the needs of decompensated cirrhosis patients. Providing educational booklets on structured care after discharge needs to be more widely promoted and adopted into the master plan for hospital services.

Given the multifaceted nature of decompensated cirrhosis, patients require a sound understanding of all elements needed for optimal care. Our study however has highlighted an apparent lack of documentation and communication between patients and treating clinicians. Forty-six per cent of patients had no documented follow-up arranged, and only 6% of patients had a documented discussion highlighting their current diagnosis. The limitation of our study relates to assessing indicators of quality improvement through patient electronic medical records (eMRs). Although eMRs may capture point-of-care data, inconsistency and missing health data are common. Therefore, eMRs may only give an incomplete picture of actual indicators of discharge care quality.

5. Conclusions

A large body of literature supports the need to improve transitions of care for decompensated cirrhosis patients across hospitals to community settings and to ensure coordination, and continuity of care post-discharge. The unacceptably high mortality figures and low disease literacy highlighted in our pilot study are an urgent reminder of the need to implement discharge care bundles to guide outpatient care treatment. It has highlighted the gaps in current care, which we aim to address following the subsequent implementation of a DCDB. Such discharge care bundles have a significant role in quality improvement as they focus on consistent and standardized best practice, especially in chronic conditions such as liver cirrhosis. We hope that the care bundle use will help improve the care of decompensated cirrhosis patients discharged from hospitals across Australia in an attempt to reduce high rates of hospital readmission. Following the implementation of a DCDB, a further review of its impact will need to be formally evaluated.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/livers2020007/s1, Table S1 Results of baseline audit of Blacktown Hospital.

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Data Availability Statement: The data presented in this study are available on request from the corresponding author.

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