Improving Quality of Care in Patients with Liver Cirrhosis

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ABSTRACT

Liver cirrhosis is a major chronic disease in the field of digestive diseases. It causes more than one million deaths per year. Despite established evidence based guidelines, the adherence to standard of care or quality indicators are variable. Complete adherence to the recommendations of guidelines is less than 50%. To improve the quality of care in patients with cirrhosis, we need a more holistic view. Because of high rate of death due to cardiovascular disease and neoplasms, the care of comorbid conditions and risk factors such as smoking, hypertension, high blood sugar or cholesterol, would be important in addition to the management of primary liver disease. Despite a holistic multidisciplinary approach for this goal, the management of such patients should be patient centered and individualized. The diagnosis of underlying etiology and its appropriate treatment is the most important step. Definition and customizing the quality indicators for quality measure in patients are needed. Because most suggested quality indicators are designed for measuring the quality of care in decompensated liver cirrhosis, we need special quality indicators for compensated and milder forms of chronic liver disease as well. Training the patients for participation in their own management, design of special clinics with dedicated health professionals in a form of chronic disease model, is suggested for improvement of quality of care in this group of patients. Special day care centers by a dedicated gastroenterologist and a trained nurse may be a practical model for better management of such patients.

Please cite this paper as:
Saberifiroozi M. Improving Quality of Care in Patients with Liver Cirrhosis. *Middle East J Dig Dis* 2017;**9**:189-200. doi: 10.15171/mejdd.2017.73.

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INTRODUCTION

Chronic diseases are the causes of about half of global diseases burden and death according to a World Health Organization (WHO) report.[1] Chronic liver disease especially liver cirrhosis (LC) is the final result of chronic parenchymal distortion, cell loss, fibrous band formation, and nodule formation, with shrinkage of the liver, resulting in portal hypertension and deranged liver synthetic function.[2] The annual global death due to LC is about one million people. The prevalence rate reported between 0.15% up to 1%, and even 4.5 - 9.5% in autopsy series.[3,4] Alcoholic liver diseases is its main cause in western countries, but hepatitis B virus (HBV) is the main cause in Iran.

In an important change during the last decade, the proportion of cryptogenic or non-alcoholic liver disease (NAFLD) related cirrhosis has increased. This change may be due to decreased HBV burden after national neonatal vaccination, increased access to health care, improved sanitary conditions, availability of more potent antiviral agents, and increased rate of NAFLD.[5-10]

Table 1: The management strategies of liver cirrhosis[22]

Consider for all patients with liver cirrhosis
1. Treatment of the underlying cause if possible
2. Screening for esophageal varices
3. Screening for hepatocellular carcinoma
4. Over the counter drugs and NSAIDs use cautions
5. Avoiding alcohol, smoking, and drug abuse
6. Possible antifibrotic agents
7. Nutritional and dietary advice
8. Avoidance of metabolic syndrome and obesity
9. Early detection and prevention of bacterial infections
10. Prevention of portal vein thrombosis
11. Prevention of hepatic decompensation
12. Management of comorbid conditions
13. Immunization against HAV, HBV, influenza, pneumonia, tetanus, diphtheria, zoster, meningococci and human papillomavirus if needed
Consider in decompensated cirrhosis and specific complications
1. Treatment of underlying cause if possible
2. Treatment and prevention of variceal bleeding
3. Treatment and prevention of ascites
4. Treatment and prevention of spontaneous bacterial peritonitis
5. Treatment and prevention of hyponatremia
6. Treatment and prevention of refractory ascites
7. Treatment and prevention of hepatorenal syndrome
8. Treatment and prevention of hepatic encephalopathy
9. Management of other complications
10. Evaluation for liver transplantation

NSAIDs; Non-Steroidal Anti-Inflammatory Drugs, HAV; Hepatitis A Virus, HBV; Hepatitis B Virus

The most common presentation in hospitalized patients with cirrhosis is ascites, which is associated with other complications in half of the cases.[11] In a report, the mortality rate in hospital in patients with complicated LC was 5.7% in comparison with patients without cirrhosis, which was 2.6%, however in patients with advanced LC in Child-Turcotte-Pugh (CTP) class C the mortality rate was 10.5%. Higher CTP score, hepatorenal syndrome, variceal bleeding, and hepatocellular carcinoma were associated with higher mortality. The highest mortality was associated with variceal bleeding and hepatorenal syndrome.[12,13] In a study from Iran, the reported survival rate has been 84%, 48%, and 25% in patients with CTP classes A, B, and C, respectively.[14] About 53% of the patients need readmission in 3 months after discharge from hospital, especially patients with diabetes, hepatic encephalopathy, prophylactic antibiotic need, and higher Model for End-Stage Liver Disease (MELD) score.[15] Patients with cirrhosis are at high risk for sepsis and sepsis-related mortality, so aggressive evaluation, prompt antibiotic therapy, and avoidance of hypo-perfusion state can improve their survival.[16]

Cardiovascular diseases and neoplasms are the most important causes of non-accidental deaths in Iran.[17,18] Patients with NAFLD induced cirrhosis are at higher risk of death from cardiovascular disease and malignancy. In patients with compensated cirrhosis, in whom the mortality of liver disease is low, more evaluation of concomitant diseases and appropriate treatment is warranted.

LC could be reversible by appropriate treatment of underlying etiology, such as HBV, autoimmune disease, and other etiologies.[19-21] So evaluation and management of the etiology is the first and the most important measure for improving the quality of care in such patients.

A holistic view on the management of LC is required for better care. In addition to diagnosis and treatment of underlying etiology, diagnosis of associated complications and special plan for their control, also need special attention. In the next step, evaluation of patients for associated diseases and other comorbid conditions for prevention of morbidity and mortality is warranted (table 1).

Adherence to Guidelines

Adherence rate to guidelines was correlated with outcome measures such as in-hospital mortality, length of stay, and 30-day readmission rate. However, there are multiple studies which showed that there is a gap between the actual practice and expected care according to the published guidelines. The adherence rate to recommendations was variable between 30-90% and overall was around 50% for different complications of cirrhosis. The adherence rate for variceal bleeding and hepatic encephalopathy were higher than other complications. Only in 33.2% of patients all recommendations were performed. The delivery of care by gastroenterologists and academic staff was associated with higher adherence rate. Implementation of quality improvement measures, when combined with educational program and a standardized order set, improved the quality of care.[23-26]

The reasons for non-adherence were lack of physician tendency, lack of special sheet in the charts, forgetfulness, insufficient time, unclear protocols, and loss of attention.[27]

According to Volk ML, the principle reasons for low quality care to patients with cirrhosis are lack of adequate knowledge in primary care physicians, inadequate readiness of health care system to give service to chronic diseases rather than acute disorders, and the denominator exclusions. The denominator exclusions are scientific, cultural, or economic reasons, for not doing standard of care by a physician.[28]

There are some reports for improvement of care in chronic diseases such as congestive heart failure, diabetes mellitus, and cancer. In inflammatory bowel disease (IBD), overuse, misuse, and underuse of facilities were important in a quality of care study.[29] In patients with LC the appropriate use of facilities needs more evaluation. The standard of care should be defined clearly in both compensated and decompensated LC for prevention of decompensation in milder form of the disease and management of complications in advanced disease state.

The quality of care

Let's have an example of quality of care in an actual case of LC.

"Just a few days ago a middle age man with cirrhosis, referred to my office on a wheelchair. He has been well and physically active under treatment with tenofovir in the last two years with good HBV control, and no ascites, variceal bleeding, encephalopathy, and liver mass. Except for mild thrombocytopenia, other tests and viral load were unremarkable. Three weeks earlier, he had developed right sided upper and lower extremity weakness and slurred speech. The final diagnosis by a neurologist was thrombotic cerebrovascular accident due to > 50% narrowing in carotid arteries."

What is your opinion about the quality of care in this patient?

Certainly, if we consider the standards of care for HBV induced LC, the quality of care is acceptable. But if we consider the overall quality of care, this is impaired, because the patient has now disability, which is related to a comorbid condition.

The Institute of Medicine has defined the quality of care as: "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge." The care of patients is actually a series of actions and special behaviors, which will be done by health professionals for improving the quality of life. There is a large gap between the defined standard levels of care and the actual health care delivery.[30] Health professionals should have enough information, skills, and motivation for doing these actions for better care.[31]

The quality of health care could be viewed from different aspects. According to Donabedian A. health care is composed of three domains of structure, process, and outcome.[32] The structure domain is composed of setting, space, health professionals, instruments, and other facilities, which are needed to provide the care. The process includes the activities that physicians, nurses, and other health personnel will do for solving the patients' problems. The outcome domain is the measure of the patients' satisfaction rate, the rate of hospital admission, the rate of office referral, rate of complications, the cost of care, the days of hospitalization, the re-admission rate, disabilities, and eventually the death rate.

Table 2: Quality indicators for measuring the quality of care in liver cirrhosis

Quality indicators		
Structure domain	**Process domain**	**Outcome domain**
Special cirrhosis clinic	Indicated abdominal paracentesis	Safety
Assigned hepatologist presence	Primary SBP prophylaxis	Cost
Coordinator/special nurse presence	Secondary SBP prophylaxis	Iatrogenic complications
Day care center facility	Prescription of diuretics at discharge	Free transplantation survival
Facilities for paracentesis	HCC screening adherence	HRQL score
Facilities for lab tests	Variceal screening adherence	Hospital re-admission rate
Accessibility of pharmacy	Referral for transplantation assessment	DALYs
Insurance support level	SBP antibiotic prophylaxis	Days of work loss
Endoscopy unit	HBV, HAV vaccinations rate	Patients' satisfaction
Paper data bank registry	Bone and mineral density evaluation	PROMs
Electronic data bank registry	Vitamin D testing	In hospital mortality
Facilities for telephone calls	Education of patients	Short term mortality
Informative brochures	Education of family members	Long term mortality
Published suitable guidelines		
Simple health care access for patients		
Hospital services		
Liver intensive care unit		
Liver transplantation unit		
Transplantation list waiting time		

HRQL: Health Related Quality of Life, DALYs: Disability Adjusted Life Years. PROMs: Patient Reported Outcome Measures, SBP: Spontaneous Bacterial Peritonitis, HCC; Hepatocellular Carcinoma, HAV; Hepatitis A Virus, HBV; Hepatitis B Virus

The qualified care should have acceptable efficacy, effectiveness, efficiency, optimality, acceptability, legitimacy, and equity.[33] Despite all of these facts, quality improvement is a humanitarian action. Physicians, nurses, and other health personnel should have enough motivation for love to serve patients, families, and community. World Health Organization suggested six characteristics for a good health care. The healthcare should be effective, efficient, accessible, acceptable/patient centered, equitable, and safe.[34]

Quality of care indicators

To measure the quality of care, we need standard activities, services, or outcomes, which indicate a qualified service for patients. These standard settings are quality indicators (QIs) that show the care is doing appropriately. Measurement of QIs, could help us for evaluating the quality of care. Abdominal paracentesis within 30 days of ascites detection or in the index hospitalization (a process QI) was correlated with lower rate of emergent readmission rate (outcome QI). Also, prophylaxis for primary spontaneous bacterial peritonitis (SBP) and discharge prescription of diuretics, which both are process QIs, and the readmission rate that is an immediate outcome QI, were correlated with lower 90-day mortality rate, which is a long-term outcome QI.[35]

There are multiple studies that defined the QIs for measurement of quality in patients with liver cirrhosis.[36-38] Delayed abdominal paracentesis and resultant delay in antibiotic treatment in SBP is associated with higher hospital mortality in decompensated cirrhosis. So one of the indicators for quality of care in patients with cirrhosis and ascites is "abdominal paracentesis in less than 12 hours of admission".[39] Early paracentesis was associated with lower re-admission rate at 1 month, and early initiation of diuretic therapy was associated with lower 3-month mortality in patients with new onset ascites and cirrhosis.[40] Implementation of more effective quality of care measures, and preventive care strategies will help to reduce the incidence of cirrhosis related complications, resource utilization, and mortality.[41]

We need simplified QIs for our routine use in clinical setting. Measurement of more complex QIs that belong to laboratory and procedural maneuvers, are difficult to assess. Some important QIs, which have been suggested for liver cirrhosis are summarized in table 2.

A useful set of QIs was suggested for measurement of quality of care in patients with liver cirrhosis. These QIs comprise 41 QIs in the domains of ascites (13 QIs), variceal bleeding (18 QIs), hepatic enceph-

Table 3: Suggested quality indicators for management of liver cirrhosis[38]

Ascites

Diagnostic paracentesis for new onset of moderate to severe ascites
Diagnostic paracentesis for hospital inpatients and patients with hepatic encephalopathy
No routine uses of fresh frozen plasma or platelet for paracentesis
Requesting routine ascitic fluid tests; cell count and differential, total protein, albumin, and culture/sensitivity
Salt restriction and diuretics* for moderate to severe ascites in patients with normal renal function **
Discontinuation of diuretics and fluid restriction in patients with ascites, if serum sodium less than 120 mEq/L
Counseling for abstaining from alcohol consumption in all patients
Prescribing empirical antibiotics within 6 hours, in hospitalized patients with PMN > 250 cells/mm^3 in ascitic fluid **
Prescribing long term outpatient antibiotics in patients with first presentation of SBP, within 1 week of hospital discharge
Prescription of antibiotics within 24 hours of admission for patients with variceal bleeding**
Prophylactic antibiotics in patients with total protein < 1.1 g/dl in ascitic fluid and serum bilirubin > 2.5 mg/dl **

Variceal bleeding

Screening EGD for varices in compensated cirrhosis, within 12 months of diagnosis
Screening EGD for varices in decompensated cirrhosis, within 3 months of diagnosis
Not receiving NSBBs in patients with negative history of variceal bleeding, and no varices on EGD
Receiving either NSBBs or EVL in patients with negative history of variceal bleeding, and medium/large varices on EGD**
Repeating EGD 1 year after the index EGD in decompensated cirrhosis, with small varices, not on NSBBs
Doing tests: CBC, BUN, creatinine, blood type, and cross-match at initial evaluation if acute Variceal bleeding
Considering at least 1 large-bore intravenous line at the time of initial evaluation if presented with acute UGIB
Documentation of resting and orthostatic vital signs at initial evaluation in patients with acute UGIB
Considering crystalloid fluids at the time of initial evaluation in patients with acute UGIB with signs of hypovolemia
Considering ICU care for patients with active bleeding or hypovolemia who are not responsive to initial fluid resuscitation
Starting somatostatin or its analogues in patients with cirrhosis and acute GIB within 12 hours of presentation **
Performing EGD within 24 hours of presentation in patients with UGIB **
Documenting the location, stigmata of bleeding, and control of bleeding in EGD procedure note
Performing EVL or sclerotherapy in patients with bleeding of esophageal varices, in the index EGD **
Receiving repeated EGD with EVL or TIPS in patients with repeated UGIB within 72 hours of index EGD
Preventing the recurrence of bleeding with EVL every 1–2 weeks until obliteration, beta-blockers, or a combination of both **

Hepatic encephalopathy (HE)

Documenting the grade of HE in the chart
Documenting the search for reversible factors of HE in the chart
Counseling the risks associated with driving in patients with HE
Receiving oral disaccharides or rifaximin in patients with persistent HE**

Liver transplantation indications

Considering liver transplantation if MELD score is > 15 and there is no absolute contraindications for LT
Considering LT if MELD score is < 15, only when there is no absolute contraindication for LT and one of the following conditions exist;
refractory ascites, recurrent variceal bleeding, recurrent HE, SBP, hepatopulmonary syndrome, or HCC meeting Milan's criteria

Preventive (general) care

HAV vaccination in non-immune patients
HBV vaccination in non-immune patients
Documentation of the MELD score in decompensated cirrhosis in initial evaluation

* spironolactone + a loop diuretic with salt restriction to about 2000 mg sodium chloride per day, **: most important with highest levels of evidences, SBP: Spontaneous bacterial peritonitis, HE; Hepatic encephalopathy, EGD: Esophagogastroduodenoscopy, NSBBs: Non-selective beta blockers, signs of hypovolemia: pulse rate > 100 per minute, systolic blood pressure < 100 mm Hg; or orthostatic changes, UGIB: Upper gastrointestinal bleeding, EVL: Endoscopic variceal ligation, TIPS: Transjugular intrahepatic portosystemic shunt, MELD: Model for end stage liver disease, LT: Liver transplantation, HAV: Hepatitis A virus, HBV: Hepatitis B virus

alopathy (4 QIs), hepatocellular cancer (1 QI), liver transplantation (2 QIs), and general cirrhosis care (3 QIs). These QIs could be implemented in any clinical situation. Of the 41 QIs, eight were ranked as most important and based on the highest quality evidence[38] (table 3).

Another set known as "Decompensated Cirrhosis Care Bundles" has been suggested for evaluation of the quality of care during the first 24 hours of admis-

sion in patients with liver cirrhosis. The presence of one or multiple organ failure associated with liver decompensation increases the mortality rate. This presentation, which defined as acute on chronic liver failure is associated with 30% mortality at 28 days.[42] Implementation of this care bundle strategy increased the rate of diagnostic paracentesis, and antibiotic use in patients with variceal bleeding. Wide use of this good care items reduces the vari-

Table 4: Suggested quality indicators for screening, diagnosis, and management of hepatocellular carcinoma.[46,47]

Indicators
1. All patients should receive surveillance program by an imaging method every 6 months.
2. Diagnosis should be based on standard protocol by high quality triphasic CT or MRI.
3. All patients with HCC should be evaluated according to BCLC staging system
4. Surgical resection for all patients with single lesion with well-preserved liver function (normal bilirubin and hepatic vein pressure gradient < 10 mmHg or platelet more than 100,000) should be considered.
5. Evaluation for liver transplantation for patients with cirrhosis and within Milan criteria should be done.
6. Evaluation and performance of loco-regional therapy for all patients in liver transplantation waiting list should be done, if waiting time is predicted to be more than 6 months.
7. Consideration of radiofrequency ablation or percutaneous ethanol injection in patients with BCLC stage 0-A, who are not eligible for liver transplant or surgery
8. Considering TACE for all patients with BCLC stage B disease
9. Offering sorafenib for all patients who have Child-Pugh Class A disease with HCC stage BCLC class C and cannot benefit from resection, transplantation, ablation or TACE

HCC: Hepatocellular carcinoma, BCLC; Barcelona Clinic Liver Cancer, TACE; Transarterial chemoembolization, CTP; Child-Pugh Class

ability of management among different centers.[43]

Other sets of quality indicators are based on the patients' perception of the quality of care instead of laboratory, and procedures. Health related quality of life (HRQL) is an important outcome quality indicator for quality of care evaluation. The disease severity according to usual scoring systems is associated with impaired HRQL scores.[44]

Patient reported outcome measures (PROMs) are QIs for better assessment and documentation of the patients' quality of care. Koloski and colleagues developed a Structured Assessment of Gastrointestinal Symptom (SAGIS) instrument for this purpose. This instrument consisted of 22 items, and validated in 1120 consecutive patients with different gastrointestinal symptoms. The researchers evaluated the symptoms of abdominal pain/discomfort, gastroesophageal reflux disease/regurgitation, nausea/vomiting, diarrhea/incontinence, and difficult defecation and constipation in this group of patients. This instrument was reliable for assessment of patients' symptoms and reduced the time required for clinical assessment by doctors. It was useful for routine clinical practice, despite the fact that this instrument could not replace the usual instruments for symptom evaluation. It could be adjusted for liver cirrhosis and be used for better assessment of the overall quality of care in routine practice.[45]

Hepatocellular carcinoma (HCC) is a grave complication of liver cirrhosis. Despite established guidelines for screening of HCC, less than 20% of patients will do it in actual practice. Most patients are diagnosed in a late stage when therapeutic measures could not be done properly.[46] Higashi and co-workers reported a high rate of adherence to six measurable QIs for care of patients with HCC in Japan. They concluded that these QIs were measurable and practical.[47] The adherence rate to recommendations such as hepatitis A and B vaccination, HCC screening, endoscopy for detection of esophageal varices, and discussion for referral to liver transplant waiting list was different in various centers.[48] Difficult access of patients to facilities, and low attention of physicians and health personnel to this important screening program are the causes of non-adherence to HCC screening. Special educational program for physicians, presence of an alarming schedule for patients' reminder, acceptance of expenses by health insurance companies, and education of patients and their families will strengthen HCC screening program.[49] QIs for HCC in patients with liver cirrhosis and other high-risk groups are abstracted in table 4.

Evaluation and appropriate management of comorbid conditions

Up to 40% of patients with liver cirrhosis suffer from one or more comorbid disease. These comorbid conditions usually affect the morbidity and mortality of these patients. The exact effects of comorbid disease on liver cirrhosis pathophysiology and the effect of cirrhosis on the course of comorbid disease need more evaluation. However, improvement of quality of care needs assessment of comorbid disease, and

Table 5: The most important reported comorbid conditions with liver cirrhosis[50-52]

Conditions with more effect on mortality	Other conditions	
COPD	HIV infection	Venous thromboembolism
Acute MI	Diabetes without complications	Peptic ulcer
Peripheral arterial disease	Diabetes with complications	Peptic ulcer + complication*
Epilepsy	Obesity	Chronic IBD
Substance abuse (non-alcoholism)	Cerebrovascular disease	Acute pancreatitis
Heart failure	Valvular heart disease	Chronic pancreatitis
Non-metastatic/hematologic cancer	Complicated high BP	Psoriasis
Metastatic cancer	IHD without acute MI	Connective tissue disease
Chronic kidney disease	Cardiomyopathy	Osteoporosis
	Cardiac arrhythmia	Hemiplegia
	Mesenteric vascular disease	Schizophrenia
		Bipolar disorder
		Depression
		Dementia

*Bleeding or perforation
COPD: Chronic obstructive pulmonary disease, MI: Myocardial infarction, IBD: Inflammatory bowel diseases, IHD: Ischemic heart disease, HIV: Human immunodeficiency virus, BP: Blood pressure

their proper management.[50] The most important comorbid conditions are presented in table 5.

There are two important comorbidity scoring systems for evaluating the impact of comorbid disease on patients' outcome. The Charlson index results from the sum of scores of 17 comorbid diseases in liver cirrhosis. The highest scores are related to HIV/AIDs, metastatic cancer, non-metastatic/hematologic cancer, complicated diabetes mellitus, kidney disease, hemiplegia, and severe liver cirrhosis.[51]

The second scoring system is Cirrhosis-Specific Comorbidity Scoring System (CirCom), which is the result of cirrhosis study in the Danish Patient Registry population. 34 possible comorbid conditions were studied. 24.2% of the cases had one or more comorbid conditions and the researchers proposed a model for estimating the mortality of patients according to the number and type of comorbid conditions. CirCom helps clinicians to predict comorbidities related increase in mortality and to improve the quality of care in this group of patients.[52]

Both Charlson and CirCom scoring systems could be used in liver cirrhosis, but the CirCom scoring system is more useful for individuals with compensated liver cirrhosis.[53] As an interesting fact applicable to our example, the chance of stroke as an important comorbid condition has been increased by 40% in patients with liver cirrhosis. In 10512 patients with liver cirrhosis, the rate of stroke was 1.9% in comparison with 1.1% for other patients without cirrhosis.[54]

How to improve the quality of care?

In addition to improving the quality of leadership, information, patient and population engagement, regulations and standards, and organizational capacity domains of care, consideration of the newer models of care delivery is also very important.[34]

Chronic disease model (CDM) has been used successfully for better care in congestive heart failure, ischemic heart disease, chronic obstructive pulmonary disease, and diabetes. This model has been useful for reducing the hospital re-admission rate, and mortality rate in multiple trials.[55] In CDM the patient is the center of care, and all activities end to the empowerment of the patient for self-care. The philosophy of this model is that "both patients and physicians are expert, one in disease knowledge and the other in the own life quality and problems. So, participation of both could help to improve the quality of care".[56] In this model, the health care team gives the sufficient knowledge to patients to be capable for evaluating and solving the usual day to day problems, or reporting them to the health care team for solution. It is based on family, organizational, and community engagement and support for self-care, and better management.[57] Availability of educated nurses as coordinators, home visits, and preparation of informative brochures are useful actions in this model.

According to this model, a patient with ascites should learn to do daily weight, record it, compare

it with the ideal weight, know how to use prescribed medications, and report unusual weight loss or excess. The patient is advised to call the nurse or doctor if he/she develops fever, abdominal pain, or difficulty with breathing. Sometimes an educated family member plays this role.

The CDM improved the ratio of outpatient care, and improved the quality of care in vaccination program, and screening program for HCC and osteoporosis in chronic liver disease.[58]

The key components for a good care via CDM for liver cirrhosis are; 1. Enhancing the patients' self-management capability, 2. Preparation of a multidisciplinary decision support systems based on evidence based recommendations, 3. Preparation of clinical informatics including the baseline characteristics and new events, lab data, medications for proper decision making, and 4. Designing a support system for training hepatology nurses, possibility of home visits, multidisciplinary care, and possibility of continuous contact with patients and their relatives. The performances of these components could be measured by an outcome QI such as the number of hospital bed days.[59] The goal of coordination in CDM is to facilitate the appropriate health care services at a suitable time, in a suitable situation or place to the patients' needs. One principle component of the care group is the patient, who is the center of the care.[60]

In multidisciplinary approach for care of a patient with cirrhosis, a trained nurse could play as coordinator between the patients and primary care physicians, internists, gastroenterologists and/or hepatologists, and other health team members in a patient-center manner.[61] Despite better care by gastroenterologists and academic staff for these patients, the access to these specialties have been less than 50% in a report from the United States. So, adequate qualified health professionals could increase the access to better care.[62]

Morando and colleagues suggested a form of ambulatory care for patients with ascites. They suggested a specialized day care center as the principle site for management. In this model, the hepatologist and special dedicated nurse are the main persons.

The patients are evaluated at the first day care hospitalization for 6-9 hours. Proper interventions and management is presented by the hepatologist at this time. Then 1-12 week appointments according to the patients' condition will be arranged. The comparison of this model with usual standard of care, revealed reduction in mortality, and overall cost of care during 12 months follow-up. This model was cost effective and suitable in Italy, however needs cost-effectiveness studies in other nations.[63]

A practical model for improving quality of care

Health leadership support and organizational capacity should be considered for changes. Facilities, spaces, budget, and adequate health professionals should be collected. The loyalty of health professionals should be increased properly. Definition and implementation of QIs will help to fulfill the standard of care. Repeated measurement of QIs and proper changes should be done again, and again until the desired level of standards be reached.[64,65] The Plan-Do-Study-Act cycle, which is a well-studied strategy for improving health care delivery, could be the base of quality improvement.[66]

A practical approach for improving the quality of care in patients with chronic liver disease is suggested in the following steps:

1. Implementation of hospital based registries for recording the data of patients with liver cirrhosis. Gastroenterology training centers and liver transplantation centers could be suitable focal points at the first, but then can be extended to other hospitals gradually.

2. Each focal point should have a dedicated gastroenterologist/hepatologist and a special trained nurse, an outpatient setting, and facilities for usual interventions needed for liver cirrhosis complications. The facilities could be defined according to the load of each focal point.

3. Definition of the model of care delivery to patients. The CDM could be helpful in this regard. A day care center will also be useful for better care.

4. Preparation of special guidelines for physicians, other health professional, and for patients.

These guidelines could be prepared by focal points under the supervision of an expert advisory team.

5. Designing a software for data gathering, including the baseline characteristics and the new events. The data entry could be done in each focal point, but the output could be analyzed and evaluated by national health system. The data should be used for finding the sites that should be changed for better care delivery.

6. Defining simple and measurable QIs by an expert panel. The QIs should be simply measurable by analyzing the gathered data from each focal point.

7. Repeated measurement and evaluation of adherence or performance of QIs.

8. Feedback to each focal point by a central advisory team of experts, with suggestions for improvement.

9. Designing new educational programs for focal points, other health personnel, and patients. These educational materials could be delivered via websites, social networks, through messages, compact disks, or letters.

10. Evaluation and continuous improvement of the whole program by an advisory team of experts under the supervision of the deputies of the Health and Research of the Ministry of Health, and Medical Education.

CONCLUSION

For improvement of the quality of care in patient with LC a more holistic view is required. In addition to the management of the liver disease and its complications per se, enough attention to care for comorbid diseases and other risk factors should be considered. Special screening and preventive measures for cardiovascular diseases and neoplasms are required. This could be done by control of important risk factors such as smoking, high blood pressure, diabetes, and hyperlipidemia, and advising dietary and exercise programs. The QIs should be customized for milder forms of LC and decompensated liver cirrhosis. The management decisions for patients with LC should be individualized, multidisciplinary, and patient-centered. The CDM, with special attention to empowering the patients' abilities to participate in their own care is a good strategic goal. Special day care centers run by dedicated gastroenterologists and trained nurses is a suitable method for better care of patients with LC.

CONFLICT OF INTEREST

The author declares no conflict of interest related to this work.

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