Medical Informatics in a United and Healthy Europe
K.-P. Adlassnig et al. (Eds.)
IOS Press, 2009

doi:10.3233/978-1-60750-044-5-270

The Role of International Classification of Diseases in Assessment of Patients with Biliary Tract Disease

Haris PANDZA [a,1], Izet MASIC [b], Reuf KARABEG [c], Braco HAJDAREVIC [d], Zekerijah SABANOVIC [e], Zoran HADZIAHMETOVIC [c]
[a] *General Hospital "Prim. Dr. Abdulah Nakaš", Sarajevo, Bosnia and Herzegovina*
[b] *Medical Faculty, University of Sarajevo, Bosnia and Herzegovina*
[c] *Clinical Center of Sarajevo University, Bosnia and Herzegovina*
[d] *Regional Medical Center "Dr. Safet Mujić", Mostar, Bosnia and Herzegovina*
[e] *Medical Faculty, University of Sarajevo, Bosnia and Herzegovina*

Abstract. One of the most common events in Surgical Ward is admission of patients with biliary tract disease. To evaluate such patients, it is necessary to create appropriate database and define attributes that will be analyzed. The patients should be divided in groups for analysis and data processing. There were 219 patients included in the study. All patients were selected on the basis of ICD-10 codes and then divided into categories according to the code. In order to assess selected patients, the database was created with all relevant questions about anamnesis, diagnostic tests and surgical procedures. The data about patients was entered into the database. It is possible to analyze data about the most frequent disorders of biliary tract. The most common entity was chronic cholecystitis with calculus and most common procedure was laparoscopic cholecystectomy. The other important attributes are also assessed. ICD-10 classification can be used as a basis for aggregation of data of the patients with biliary tract disease. Some of the codes are more frequent than others and some are rarely used.

Keywords. ICD, biliary tract disease, patient assessment

1. Introduction

The biliary tract disease is one of the most common entities that can be seen at Surgical Ward. The cost of treatment at national level of biliary tract disease is significant. The first goal that can be achieved is appropriate grouping of patients according to the severity and type of disease. The coding of biliary tract disease should be routinely performed during the hospitalization to enable later data retrieval. This data should be stored in databases together with other relevant data in order to analyze the data [1]. One of the methods to extract the data of patients who suffer from biliary tract disease from the hospital database is to search by diagnosis. In this way, most of the patients will be found except in cases where different name of the disease (synonym) is used or where the diagnosis is misspelled. The other important issue arises in case of countries

[1] Corresponding Author: Dr Haris Pandza, MSc. General hospital "Prim. Dr. Abdulah Nakaš", Sarajevo, Bosnia and Herzegovina; E-mail: haris.pandza@gmail.com.

where different languages are used for the diagnosis nomenclature and where datasets can be prone to error. The most of words used are medical terminology of Latin and Greek origin, but spelling is slightly different. Another example is prefix "haema" or "hema" (meaning blood in old Greek), which is used differently in American (hema) and British (haema) English. In many European countries Latin language is in use for diagnosis assignment.

Classification is the "systematization of classes or groups, or systematized division of series of related phenomena in the groups or classes". The purpose of classification is to provide communication and control. Classification is the "process by which a large number of phenomena is reduced and organized into categories or classes according to established criteria for one or more purposes". Communication is achieved using the standard terms of categories or members, during which a high degree of approval in the application of certain categories for a particular phenomenon is ensured [1].

The most widely used classification is International Classification of Diseases (ICD-10) that is used in most European countries and is the base for DRG classification [2, 3]. There are several classes of condition that are connected with benign disorders of biliary tract. The first group of disorders is related to biliary stones and has code K80. The second group considers cholecystitis without stones and is labeled with code K81. Third group are other diseases of gallbladder (hydrops, perforation, fistula, cholesterolosis, dyskinesia, hypertrophy etc.). The fourth group includes other diseases of biliary tract without stones (cholangitis, occlusion, stenosis etc.). Major ICD codes for biliary tract disorders are: K80 – Cholelithiasis; K81 – Cholecystitis; K82 – Other diseases of gallbladder; K83 – Other diseases of biliary tract.

2. Patients and Methods

The database was created with a dataset suited for the assessment of biliary tract disease. The database includes the most common attributes that are connected with patient hospitalization including anamnesis, ultrasound or other imaging data, laboratory findings, operation and postoperative and operative complications. The first step was creation of a data carrier – the form with all questions about the patient and operation including complications. The data was collected during the hospital stay, at the time of admission, after operation and after discharge from the hospital. Then, the main table of database was created in MS Access with all the fields from the form. Special rules were set for all the fields including prevention of entering the incorrect value, field formatting and explanation of rules in case of erratic input. The form for data input was then additionally designed (control buttons for the database navigation, search form etc.). Specific query was created for every field to analyze the data.

There were total of 219 patients with biliary tract disease who were hospitalized at Surgical Ward of General Hospital "Prim. Dr. Abdulah Nakaš" in five months. The total number of hospitalized patients at the Surgical Ward of the General Hospital "Prim. Dr. Abdulah Nakaš" in this period was 1,194.

Inclusion criteria: patients who were hospitalized due to biliary disorder where biliary disorder was primary diagnosis and cause of hospitalization.

Exclusion criteria: patients who were hospitalized because of other reasons and patients with biliary disease where reasons of hospitalization were other diseases.

Particular database was created and the data about patients was grouped, processed and analyzed. Data was entered in a data carrier, including the complications such as wound infection (can be common attribute for all patients undergoing surgery), pneumonia or deep vein thrombosis.

3. Results

Aggregation of data was done according to the diagnosis by ICD code, gender, procedure and morbidity to get the information about patients with biliary tract disorder. It is obvious from Table 2 that main cause of biliary morbidities is cholecystolithiasis (K80). The decision about operative approach is usually made before the hospitalization in chronic cases where patients with higher operative risks are excluded prior to the hospitalization. The number of female patient hospitalized at the Surgical Ward due to biliary disorder is significantly higher than of male patients (Table 1). We can notice that percentage of acute cholecystitis is much higher in male patients (20%) than in female (13.5%), which leads us to the conclusion that male patients are more prone to develop acute form of disease (statistically significant difference).

Table 1. The frequency of observed biliary disorders according to gender

ICD	Diagnosis	Male	Female	Total	Total
K80.0	Calculus of gallbladder with acute cholecystitis	12	18	30	212
K80.1	Calculus of gallbladder with other cholecystitis (chronic)	48	133	181	
K80.4	Calculus of bile duct with cholecystitis	1	0	1	
K81.0	Acute cholecystitis without calculus	1	0	1	1
K82.1	Hydrops of gallbladder without calculus	1	0	1	2
K82.8	Other specified diseases of gallbladder (atrophy)	1	0	1	
K83.0	Cholangitis without calculus	1	1	2	4
K83.1	Obstruction of bile duct (stenosis)	0	2	2	
	Total	65	154	219	219

In ICD code K80.1 comes in combination with other diseases codes. These other diseases indicate diseases that can affect the course of illness and prognosis as well as the treatment. In cases where there is comorbidity, surgeon will decide to perform the conservative treatment instead of operation. The majority of patients admitted to the hospital with primary biliary disease underwent surgery (Table 2). From 219 patients, only 27 did not undergo surgery due to concomitant disease or other conditions. In 17 cases the primary diagnosis was not chronic cholecystitis and such patients were not included. The same case is with K80.0 code but these patients are prone to have more concomitant conditions that can endanger their life. There were two lethal outcomes in this group that are connected with serious comorbidity.

Table 2. Treatment of patient with biliary tract disease

ICD code	Open chole-cystectomy	Laparoscopic cholecystectomy	Conversion to open cholecystectomy	Not operated	Operated /total
K80.0	14	10	3	6	26/30
K80.1	25	129	7	18	161/181
K80.4	1	0	0	0	1/1
K81.0	1	0	0	0	1/1
K82.1	0	1	0	0	1/1
K82.8	0	0	0	1	0/1
K83.0	0	0	0	2	0/2
K83.1	1	0	0	0	1/1
Total	42	140	10	27	192/219

Out of 30 patients with acute cholecystitis with calculus, 18 were admitted as emergency cases and 12 as elective, while out of 181 cases with chronic (other) cholecystitis, 14 were admitted as emergency and 167 as elective cases (Figure 1). It is obvious that majority of biliary tract surgeries can be performed on elective basis. From 219 patients admitted due to biliary tract disorder, 32 patients were admitted as emergency cases.

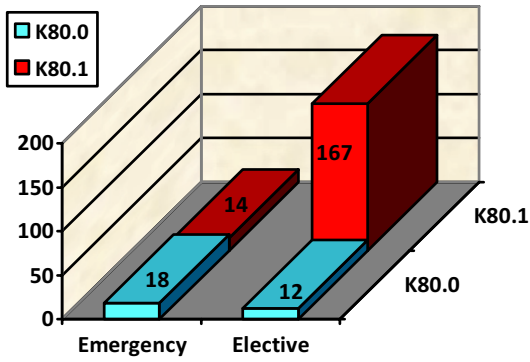

Figure 1. Emergency and elective cases according to the ICD codes for cholecystitis

If we compare the length of hospital stay in patients where cholecystectomy is performed we can notice that this attribute depends on operative method and whether it is acute or chronic inflammation of the gallbladder. The patients who underwent open surgery had longer hospital stay. The same case is with patients who had acute cholecystitis.

4. Discussion and Conclusion

A comprehensive database enables us to make matches between any two groups of patients – makes it possible to compare laparoscopic and open surgery patients and to determine whether more complications occur in patients who had open cholecystectomy than in those who have laparoscopic cholecystectomy. Patients were divided on the basis of several criteria. The grouping of patients can be performed according to ICD code because grouping according to the diagnosis can be impractical and imprecise. An important attribute is the urgency of admission because this attribute to a large extent affects the total cost of the treatment. First of all, there is the gender of patients. We tried to determine whether there are differences in gender in the total number of hospitalization days, the length of hospitalization, percentage of operated patients and the age of patients. All these tasks can be performed using simple query that will include items that we want to compare. The ICD code has predictive value in cases where chronic and acute condition can be separated. Biliary tract obstruction can influence prognosis. In order to be able to compare some parameters, it is necessary to pre-determine the appropriate attributes that define them. The most important parameter is diagnosis coded using the ICD classification. This database can be easily enlarged to accept data about other conditions that have predictive value to morbidity and mortality. The database scope can be enlarged to accept ICD codes of all conditions and diseases and to perform similar tasks for other conditions (hernia, colon disorders etc.). The international database can be convenient in order to compare the results. Also, this is the only way to perform survey on the national level. That would be possible if the database is available online to all surgeons at the national level or even at the international level. Such project has already been realised in the USA without use of ICD classification for patient grouping [4, 5]. This database is intended to be a part of Hospital Medical Database and represent one of the modules that the database should contain. This is only one of the segments where ICD classification can be used because it includes, in this case, very common medical conditions where ICD classification can easily be used for grouping of patients according to the primary or secondary diagnoses by ICD codes. The additional time required for input of data can be compensated by information retrieval which can improve the work of a hospital and results can be used for further scientific research. The purpose of the database is the creation of a tool that can be used for clinical data analysis in order to facilitate the role of parameters included in the study. The database can be useful in hospital planning and management and quality assessment.

References

[1] Pandza, H. (2004) Assessment of patient with biliary tract disease. *Medicinski Arhiv* 58(1 Suppl 2):146.
[2] World Health Organization (2004) *International Statistical Classification of Diseases and Related Health Problems*. Tenth revision, Second edition, World Health Organization, Geneva.
[3] Harrison, D.A., Brady, A.R., Rowan, K. (2004) Case mix, outcome and length of stay for admissions to adult, general critical care units in England, Wales and Northern Ireland: The Intensive Care National Audit & Research Centre Case Mix Programme Database. *Critical Care* 8(2):R99–111.
[4] Velanovich, V., Shadduck, P., Khaitan, L., Morton, J., Maupin, G., Traverso, L.W. (2006) Analysis of the SAGES Outcomes Initiative groin hernia database. *Surgery Endoscopy* 20(2):191–198.
[5] Velanovich, V., Morton, J.M., McDonald, M., Orlando III, R., Maupin, G., Traverso, L.W. (2006) Analysis of the SAGES outcomes initiative cholecystectomy registry. *Surgical Endoscopy* 20(1):43–50.