

Development of a Rating System for Digestive System Impairments: Korean Academy of Medical Sciences Guideline

A systematic and effective welfare system for people with digestive system impairments is required. In Korea, an objective and scientific rating guideline does not exist to judge the digestive system impairments. Whether the impairments exist or not and the degree of it need to be examined. Thus, with these considerations we need a scientific rating guideline for digestive system impairments to fit our cultural and social background. In 2007, a research team, for the development of rating impairment guidelines, was organized under the supervision of Korean Academy of Medical Sciences. The rating guidelines for digestive system impairments was classified into upper and lower gastrointestinal tracts impairments and liver impairment. We developed objective rating guidelines for the upper gastrointestinal tract, the impairment generated after surgery for the stomach, duodenum, esophagus, and for the lower gastrointestinal tract, the impairment generated after construction and surgery for colon, rectum, anus, and intestinal stomas. We tried to make the rating impairment guidelines to include science, objectivity, convenience, rationality, and actuality. We especially emphasized objectivity as the most important value. We worked to make it easy and convenient to use for both the subjects who received the impairment ratings and the doctors who will give the ratings.

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INTRODUCTION

The standard of living is continually improving with the increase of national wealth. Accordingly, interest in the lives and welfare of the disabled is also improving which requires execution of a systematic and effective policy for the disabled. In order to operate it, guidelines to rate the impairments objectively and scientifically is required (1-3). The impairment rating guidelines currently used in Korea causes distrust and complaints. This is due to diagnostic errors, bogus disabled, and the fact that guidelines for the impairment of the digestive system does not even exist (2, 7). There are many people unable to carry on normal lives due to serious digestive system diseases, and yet no help is given from the nation and society due to lack of proper guidelines. The United States has already a scientific impairment rating guideline prepared by the American Medical Association (AMA). Therefore, we have decided to develop our own scientific and objective diges-

tive system impairment rating guidelines fitting the given conditions of Korea based on social and cultural realities.

MATERIALS AND METHODS

The research committee was organized by specialists who have knowledge and experience in rating digestive system impairments under the supervision of the Korean Academy of Medical Sciences (KAMS). The committee consists of the medical doctors of internal medicine, general surgery, family medicine, and medical law and ethics. The committee members received education on the background and purpose, basic concept, rating methods, and principles of impairment of the rating impairment guidelines. The members analyzed the systems of European union, U.S.A. and many countries in Asia including the digestive system impairment rating. Especially AMA Guides (8) that was reformed and put into prac-

tice from the year 2000 was heavily referred. We used these guidelines positively in a way by making them satisfy the conditions of Korea, and then developed the digestive system impairment evaluation guidelines under the management of KAMS.

In this evaluation guideline of the digestive system was divided into three parts: the upper and lower gastrointestinal tracts and the liver. We examined the lives of people with digestive diseases to see whether or not they could carry on with normal activities. We evaluated the loss of function in the digestive system as 100% impairment due to the possibility of death from function loss. We fixed the impairment rate in proportion to the impairment state with the relative rate to the loss before functioning.

RESULTS

General principles

We paid careful attention to the KAMS Guidelines to satisfy the requirements of science, objectivity, convenience, rationality, and actuality. We placed objectivity as the most important value. Impairment evaluation should be conducted when the symptoms are in a fixed state, but if there is an expected change of symptoms, then another evaluation should be made two years later. In principle, the subject of impairment for medical evaluation should be as fixed symptoms that are left without recovery upon completion of treatment.

The source of impairment does not have to result from traumas, but may also come from congenital diseases and just as a disease itself. The impairment should be evaluated by specialists of the appropriate fields of which it belongs to. We evaluated the loss of function in the digestive system as 100% impairment due to the possibility death from the loss of functions. We fixed the impairment rate in proportion to the impairment state with the relative rate to the loss before functioning.

Evaluation guidelines for the upper gastrointestinal tract impairments

The upper digestive tract includes the esophagus, stomach, duodenum, small intestine, and pancreas. Useful objective methods for confirming upper gastrointestinal tract impairments are: 1) fluoroscopy, contrast media using radiological tests and imaging studies such as a computed tomography (CT) or an magnetic resonance imaging (MRI), 2) cytology test or endoscopy including a biopsy, 3) esophageal manometry, 4) gastric acid secretory studies, 5) absorption abnormality test, 6) stool studies, and 7) *Helicobacter pylori* urea breath test. Also, fat content in the stool and intestinal malabsorption may be examined.

The impairment rate, as signified in percentage, reflects the anatomical, physiological, and functional abnormality occurring in an organ or system and the ability to perform daily activities. Patients belong to the normal scope of gastrointestinal impairments if patients are able to perform daily

Table 1. Evaluation guidelines for stomach or duodenum impairment

Rate of physical impairment (%)	
Above 75%	<ol style="list-style-type: none"> 1. In the case where it is impossible to carry on with daily life due to continual pain, bleeding, perforation of the intestine, duodenum diseases or damages requiring treatment in the hospital or surgical treatment is impossible due to other accompanying diseases 2. In the case of over 30% weight loss due to gastrointestinal or duodenum diseases or damages
50-74%	<ol style="list-style-type: none"> 1. In the case where it is impossible to carry on with daily life due to continual pain, bleeding, perforation of the intestine, duodenum diseases or damages requiring treatment in the hospital and surgical treatment is possible. Reevaluation is required one year after evaluation 2. In case of 20-30% weight loss due to gastrointestinal or duodenum diseases or damages
30-49%	<ol style="list-style-type: none"> 1. In the case of considerable disorder in daily life due to continual pain, bleeding, perforation of the intestine, duodenum diseases or damages requiring intermittent treatment in the hospital 2. In the case of 10-19% weight loss due to gastrointestinal or duodenum diseases or damages 3. In the case that the patient underwent more than once surgical operation due to gastrointestinal or duodenum diseases or damages, and in patients with dumping syndrome, reflux esophagitis, malabsorption, etc. Reevaluation after one year is required
20-29%	<ol style="list-style-type: none"> 1. In the case of intermittent treatment in the hospital is required due to continual pain, bleeding, perforation of the intestine, duodenum diseases or damages 2. In case of 0-9% weight loss due to gastrointestinal or duodenum diseases or damages 3. In the case that the patient underwent more than once surgical operation due to gastrointestinal or duodenum diseases or damages so continual care is needed. Reevaluation after one year is required
10-19%	<ol style="list-style-type: none"> 1. In the case that the symptoms caused by gastrointestinal, duodenum diseases or damages were eased due to treatment but continual care is needed
0-9%	<ol style="list-style-type: none"> 1. In the case of occurring lasting pain, bleeding, perforation due to gastrointestinal or duodenum diseases or damages but recovered with surgery

activities; show regular and intermittent gastrointestinal manifestations without need of specific dietary treatment or medications; and are able to keep normal weight with the necessary nutrition.

We divided the upper gastrointestinal tract impairments into the stomach, the duodenum, the esophagus, and upper gastrointestinal tract after surgery (Table 1-3).

Evaluation guidelines for the lower gastrointestinal tract impairments

The lower gastrointestinal tract impairments include the colon, the rectum, and the anus. The signs and symptoms of the lower gastrointestinal tract impairment are: abdominal pain, pelvic pain, perineal pain, difficulty of defecation,

tenesmus, stool incontinence, hematochezia, abscess, fissure, and fistula. In general findings, fever, weight loss, weakness, anemia, etc. may indicate lower gastrointestinal tract impairment. Useful objective methods to confirm colon, rectum, and anus impairment are the following tests such as: 1) digital rectal examination, proctoscopy, sigmoidoscopy, colonoscopy, 2) biopsy, 3) microscopic examination of the stool and cultivation, 4) fluoroscopy and radiological test using contrast media, and 5) CT and MRI examinations.

The impairment rate, as signified in percentage, reflects the anatomical, physiological, and functional abnormality occurring in an organ or system and the ability to perform daily activities. Patients belong to the normal scope of gastrointestinal impairments if patients are able to perform daily activities; show regular and intermittent gastrointestinal mani-

Table 2. Evaluation guidelines for esophagus impairment

Rate of physical impairment (%)	
Above 75%	<ol style="list-style-type: none"> 1. With the symptoms of gastroesophageal reflux disease (GERD), dysphasia, dynophagia due to disease in the esophagus and damage which prevents daily life in that the patient requires treatment in a hospital with an endoscopy, an esophagography, or an esophageal manometry, and significant anatomical, functional damage in the esophagus was found. Surgical treatment is impossible due to other accompanying diseases 2. Above 30% weight loss due to diseases or damages in the esophagus
50-74%	<ol style="list-style-type: none"> 1. With the symptoms of gastroesophageal reflux disease (GERD), dysphasia, dynophagia due to esophageal disease and damage which prevents daily life in that the patient requires treatment in a hospital with an endoscopy, an esophagography, or an esophageal manometry, and significant anatomical, functional damage in the esophagus was found. Surgical treatment is possible and reevaluation after a year is required 2. 20-29% weight loss due to the diseases or damages in the esophagus
25-49%	<ol style="list-style-type: none"> 1. With the symptoms or stigma of continual gastroesophageal reflux disease (GERD), dysphasia, dynophagia due to diseases or damages in the esophagus from the results of an endoscopy, an esophagography, or an esophageal manometry, and significant anatomical and functional damage in the esophagus was found, and medical care is needed 2. 10-19% weight loss due to diseases or damages in the esophagus

Table 3. Evaluation guidelines of impairment after an operation of the upper digestive tract

Rate of physical impairment (%)	
75%	<ol style="list-style-type: none"> 1. In the case of surgery of the upper digestive tract (esophagus, stomach, duodenum, small intestine, pancreas, gallbladder, bile duct) was performed requiring treatment in the hospital for continual parenteral nutrition to control symptoms and complications or malnutrition and weight loss of over 30% occurred after becoming ill An evaluation 6 months after surgery and reevaluation after a year is required
50-74%	<ol style="list-style-type: none"> 1. In the case of surgery of the upper digestive tract (esophagus, stomach, duodenum, small intestine, pancreas, gallbladder, bile duct) was performed requiring parenteral nutrition to control symptoms and complications or malnutrition and weight loss over 20-29% occurred after becoming ill An evaluation 6 months after surgery and reevaluation after a year is required
25-49%	<ol style="list-style-type: none"> 1. In the case of surgery of the upper digestive tract (esophagus, stomach, duodenum, small intestine, pancreas, gallbladder, bile duct) was executed requiring parenteral nutrition to control symptoms and complications and malnutrition and weight loss of over 20% occurred after becoming ill An evaluation 6 months after surgery and reevaluation after a year is required
10-24%	<ol style="list-style-type: none"> 1. In the case of surgery for upper digestive tract (esophagus, stomach, duodenum, small intestine, pancreas, gallbladder, bile duct) was executed requiring intermittent treatment at a hospital to control symptoms, signs and weight loss of less than 9% occurred after becoming ill An evaluation 6 months after surgery and reevaluation after a year is required
0-9%	<ol style="list-style-type: none"> 1. In the case of surgery of the upper digestive tract (esophagus, stomach, duodenum, small intestine, pancreas, gallbladder, bile duct) was performed, but follow-up was not needed An evaluation 6 months after surgery and reevaluation after a year is required

Table 4. Evaluation guidelines for colon and rectum impairment

Rate of physical impairment	
Above 75%	In the case of impossible daily life due to continuous diarrhea and bleeding by chronic Inflammatory Bowel Disease (IBD) and requiring treatment in a hospital and yet surgical treatment is impossible due to other accompanying diseases and over 30% weight loss due to chronic IBD
50-74%	In the case of impossible daily life due to continuous diarrhea and bleeding by chronic Inflammatory Bowel Disease (IBD) requiring treatment in a hospital and surgical treatment is possible. Reevaluation after a year is required and 20-29% weight loss due to chronic IBD
35-49%	In the case where intermittent treatment in a hospital is required due to continuous diarrhea and bleeding, and complications generated from IBD and when medications do not work and in the case of an enterocutaneous fistula generated from chronic IBD and 10-19% weight loss due to chronic IBD
20-35%	In the case of a surgical operation for chronic IBD more than once and lasting care is required and less than 10% weight loss due to chronic IBD
10-19%	In the case of symptoms of chronic IBD being eased intermittently by treatment, but continual care is still required
0-9%	In case of the existence of chronic IBD symptoms, but performance of normal daily life is possible

Table 5. Evaluation guidelines for anal impairment

Rate of physical impairment	
36-45%	In the case of continual incontinence of a formed stool due to considerable loss of anal sphincter muscles generated from diseases or damages and has been confirmed by a manometry
35-19%	A state of chronic anal fistula generation due to diseases or damages, and recovery was not possible even with surgery, and intermittent fecal incontinence of a formed stool which requires continual treatment
10-19%	Intermittent gas or liquid stool incontinence
0-9%	In the case of periodic colonic irrigation or enema due to severe constipation, and in the case of continuous pain in the anus or constipation which has been diagnosed as perineal descent syndrome In the case of incontinence, if recovery after treatment is expected, then reevaluation is performed after a year

Table 6. Evaluation guidelines of impairment after an ostomy

Rate of physical impairment	
50-75%	In the case of possessing more than two intestinal stomas in the state that the intestinal contents keep draining through holes other than the intestinal stomas which show impossibility of a cure even with surgery and more than one of them are accompanied by complications
40-49%	In the case of possessing more than two intestinal stomas and in the case of possessing an ileostomy, transverse colostomy, or urostomy in the state that the intestinal contents continually drains through holes other than the intestinal stomas which show impossibility of a cure even with surgery and more than one of them are accompanied by complications
15-39%	Patients with an ileostomy or transverse colostomy and in the case of possessing a sigmoid colostomy in the state that the intestinal contents continually drains through holes other than the intestinal stomas which show impossibility of a cure or accompanied by complications
-14%	Patients with a transverse or sigmoid colostomy

festations without need of specific dietary treatment or medications; and are able to keep normal weight with necessary nutrition.

We divided the lower gastrointestinal impairments evaluation into the colon, rectum, anus, intestinal stomas and after surgery of the lower gastrointestinal tract (Table 4-7).

Evaluation guidelines for liver impairment

The symptoms of hepatic bile impairment are pain, nausea, vomiting, anorexia, general weakness, fever, jaundice, and itching. The symptoms of progressive liver disease com-

plications are edema, ascites, esophageal varix, portal hypertension which generates bleeding, hepatic encephalopathy, metabolic impairment, and the loss of kidney function. Useful objective methods to confirm liver impairments are 1) an abdominal sonogram, 2) radiological examination such as percutaneous and endoscopic cholangiography, 3) CT and MRI, 4) liver isotope studies, 5) liver biopsy & fine needle aspiration biopsy, and 6) a laboratory test for diagnosis of bile duct and other liver functions. The determination of impairment degree occurred by liver diseases is executed by specialists noting the clinical symptoms, results of the liver function test, and the results of the image test. The evaluation

Table 7. Evaluation guidelines of impairment after an operation of the lower digestive tract

Rate of physical impairment	
0-19%	In the case of an ulcer and inflammation around the anus due to frequent defecation after rectal cancer or rectal trauma An evaluation 6 months after surgery and reevaluation after a year is required

Table 8. Evaluation guidelines for liver impairment

Rate of physical impairment (%)	
Above 75%	With objective proof (Child-Pugh grades B, C) of progressive chronic liver disease (such as liver cirrhosis) with at least one of the following: 1) Refractory ascites not controllable by medical care 2) Chronic hepatic encephalopathy 3) Hepatorenal syndrome 4) Hepatopulmonary syndrome
50-74%	With objective proof (Child-Pugh grades B, C) of progressive chronic liver disease (such as liver cirrhosis) with all three of the following in a mixed state occurring more than 3 times a year: 1) Hepatic encephalopathy 2) Spontaneous bacterial peritonitis 3) Esophagus or stomach, varix bleeding
35-49%	With objective proof (Child Pugh grades B, C) of lasting liver disease with one of the following in a mixed state occurring 2 times a year: 1) Hepatic encephalopathy 2) Spontaneous bacterial peritonitis 3) Esophagus or stomach, varix bleeding
10-34%	With objective proof of (Child-Pugh grades B, C) of lasting liver disease with one of the following in the patient's past history: 1) Ascites 2) Varix bleeding 3) Hepatic coma 4) Spontaneous bacterial peritonitis
0-9%	Chronic liver disease (such as liver cirrhosis) or underwent liver transplantation due to hepatocellular carcinoma

criterion of liver impairment is summarized in Table 8.

DISCUSSION

We developed an evaluation guidelines for digestive system impairments under the supervision of KAMS suitable to the conditions of Korea by referring to the AMA Guides. The disabled people in Korea, social environment, and hospital environment were taken into consideration while drawing up the guidelines. We worked to make it easy and convenient to use for both the subjects who receive the impairment evaluation and the doctors who give the evaluation.

The guidelines of the impairment rating are the synthesis of science and public opinion (8). The rating of digestive system impairments of KAMS are the clinically evaluated ratings of physical impairments. The physical impairment of AMA Guides are also the ratings of physical impairments. In order to satisfy the scientific characteristics, we referred to the AMA Guides as our model. The impairment rate of AMA has scientific characteristics and public trust to be used as a "global standard" (4). To satisfy objectivity we considered the patient's signs but did not consider the patient's symptoms as much. For this we rated the impairment according

to the objective signs and the results of examinations. Using this score we developed a method of evaluating the degree of impairment. We avoided excessively detailed evaluation for convenience, introducing a comprehensive evaluation method so that the evaluation of overall functions will be achieved. We made a sum total of the varied impairments of a specific area not to be greater than the total functional loss of the appropriate organ.

This impairment evaluation is divided into the upper and lower gastrointestinal tracts and liver. In regarding the upper gastrointestinal tract of the stomach, duodenum, and esophagus, we also determined the impairment rate after surgery for the upper gastrointestinal tract, unlike the AMA Guides. The decision to include the impairment rate after surgery is because many people, who undertook surgical operation for the upper gastrointestinal tract, complain of the difficulty in performing daily life tasks, but no objective evaluation guidelines had existed in the U.S.A. as well as in Korea for this situation. Accordingly, the impairment evaluation after surgery for the digestive system would be useful.

Regarding the lower gastrointestinal tract, we made consensus on the evaluation guidelines for impairment of constructed intestinal stomas. This new consensus was a modification of previously used guideline in Korea. The guidelines

were converted into an impairment rating scale. The impairment evaluation of anal disease was determined objectively. Stool incontinence generated from anal sphincter impairment was given special consideration.

In choosing evaluation guidelines for the upper gastrointestinal tract, we considered weight loss. If the organ is unable to absorb nutrition, it causes weight loss. The measurement of weight loss is economical and easy in that both patients and doctors would agree objectively and it would be a useful evaluation guideline for upper gastrointestinal tract impairment. If the impairment can be cured with surgical treatment, the patient is to be reexamined after a year to receive an objective and rational evaluation. The same goes for lower gastrointestinal tract impairments.

The Child-Pugh classification should be followed objectively in the case of liver impairment, with leftover function of the liver. Complications such as ascites, spontaneous bacterial peritonitis, hepatic encephalopathy should be regarded, and then we made the entire impairment guidelines of liver disease objectively and easily.

These impairment guidelines are developed after Korean environment for disabled people and hospitals. Considering the reality, the present impairment guidelines needs supplementary and periodic improvements. With respect to the hospital environment, close examination might be needed for improved scientific evaluation. Not all hospitals possess very expensive and rare equipment. Therefore, doctors should be able to rate impairments objectively with general equipment. In some patients that need more attention, referral system to a hospital with special equipment is needed.

The evaluation of digestive system impairment is applied to a medically permanent impairment, a fixed physical state but not a temporary state of impairment. Permanent impairment means a fixed impairment which has not changed a year after evaluation (5, 6, 8). A certain time interval was set up for evaluation of the digestive system impairment after it is fixed. The fixation of symptoms is generally judged after completion of treatment, but it is not always the case. If it does not get worse or there is no possibility of getting better, it could be considered as a fixed symptom, even during treatment. If the symptom or impairment gets worse, another team of interval could be set up the patient. Regarding the symptom without an objective evaluation tool with which most people would agree, such as pain, the committee agreed

to defer the impairment evaluation until a useful evaluation tool is developed (9, 10).

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REFERENCES

1. Lee KS, Bae HG, Yun IG, Doh JW. *An estimation of economic costs for disability evaluation in Korea. Indep Med Exam* 2007; 4: 28-34.
2. Li Z, Kang SH, Lee SD. *Review of Korean disability evaluation systems and suggestions for the improvement direction. Korean J Leg Med* 2007; 31: 16-30.
3. Rhee CO, Choi JK, Son MA, Moon OR. *A comparative study on evaluation methods of permanent impairment in Korea. Korean J Prev Med* 1994; 27: 627-51.
4. Lee KS. *Assessment of physical impairment and disability evaluation. J Korean Neurosurg Soc* 1994; 23: 276-82.
5. Lee SG. *Problems of assessment of physical impairment and disability evaluation in the central nervous system in Korea. Indep Med Exam* 2004; 1: 20-5.
6. Lee SG. *Review of the disability grade documents with central nervous system impairment by the law of Ministry of Health and Welfare. Indep Med Exam* 2006; 3: 6-11.
7. Cho KH. *The present condition and problems of guidelines for disability evaluation in Korea. Indep Med Exam* 2004; 1: 35-7.
8. Cocchiarella L, Andersson GBJ eds. *Philosophy, purpose, and appropriate use of the guides. The guides to the evaluation of permanent impairment. 5th ed. Chicago, Ill: American Medical Association* 2001; 1-16.
9. Robinson JP, Turk DC, Loeser JD. *Pain, impairment, and disability in the AMA guides. J Law Med Ethics* 2004; 32: 315-26.
10. Rondinelli RD, Katz RT. *Merits and shortcomings of the American Medical Association guides to the evaluation of permanent impairment, 5th ed. A psychiatric perspective. Phys Med Rehabil Clin N Am* 2002; 13: 355-70.