Way forward: Geriatric frailty assessment as risk predictor in gastric cancer surgery

Juul JW Tegels, Jan HMB Stoot

Juul JW Tegels, Jan HMB Stoot, Department of Surgery, Zuyderland Medical Centre, 6130 MB Sittard, The Netherlands

Author contributions: Tegels JJW and Stoot JHMB equally contributed to this work.

Conflict-of-interest statement: None.

Open-Access: This article is an open-access article which was selected by an in-house editor and fully peer-reviewed by external reviewers. It is distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: http://creativecommons.org/licenses/by-nc/4.0/

Correspondence to: Jan HMB Stoot, MD, PhD, Department of Surgery, Zuyderland Medical Centre, PO Box 5500, 6130 MB Sittard, The Netherlands. j.stoot@orbisconcern.nl
Telephone: +31-88-4597777
Fax: +31-88-4597975

Received: February 20, 2015
Peer-review started: February 22, 2015
First decision: April 27, 2015
Revised: May 19, 2015
Accepted: August 30, 2015
Article in press: August 31, 2015
Published online: October 27, 2015

Abstract

In gastric cancer patients chronological and biological age might vary greatly between patients. Age as well as American Society of Anaesthesiologists-physical status classifications are very non-specific and do not adequately predict adverse outcome. Improvements have been made such as the introduction of Charlson Comorbidity Index. Geriatric frailty is probably a better measure for patients resistance to stressors and physiological reserves. An increasing amount of evidence shows that geriatric frailty is a better predictor for adverse outcome after surgery, including gastric cancer surgery. Geriatric frailty can be assessed in a number of ways. Questionnaires such as the Groningen Frailty Indicator provide an easy and low cost method for gauging the presence of frailty in gastric cancer patients. This can then be used to provide a better preoperative risk assessment in these patients and improve decision making.

Key words: Gastric cancer; Surgery; Geriatric frailty

© The Author(s) 2015. Published by Baishideng Publishing Group Inc. All rights reserved.

Core tip: Geriatric frailty assessment is an important way forward in order to provide a better preoperative risk assessment in gastric cancer surgical patients.
likely due to higher incidence comorbidities\(^2\). The American Society of Anaesthesiologists (ASA) - Physical status has been introduced in the former century and gained widespread acceptance as a scoring system for determining a patient’s physical status. It has long been used to assess risks from surgery. But surgical risk assessment is complex and ASA classification is only a component of overall assessment. A major problem with ASA classification is the degree of interobserver variability, i.e., different scores are ascribed to the same patient by different assessors\(^5\).

Moreover, it is also limited as a predictive measure for adverse postoperative events; it performed moderately for prediction of postoperative mortality in a recent meta-analysis\(^5\). Also, it performed better in populations with lower rather than higher mortality rates\(^6\).

The Charlson Comorbidity Index (CCI) is another method for classifying comorbid conditions that determine risk of mortality\(^7\). This method has a much more clearly defined scoring system than the ASA classification. A study in octo- and nonogenarians who underwent surgery for gastric cancer showed that higher morbidity and mortality rates were associated with higher CCI (CCI \(\geq 5\))\(^8\). In contrast, a German study, which included 139 patients, did not find this association between CCI and adverse postoperative events. Age was an independent predictor for postoperative course\(^9\). So age and comorbidities are not universally found to be predictors for adverse outcome.

The fact that age is not sufficient to exclude patients from treatment is fairly widely accepted\(^10\)–\(^12\).

It is almost redundant to say that a patient’s chronological age does not necessarily correspond with their biological age. Biological age is mainly determined by frailty, a state of vulnerability to stressors in older individuals, which leads to an increased risk of developing adverse health outcomes\(^13\). Frailty, as a predictor for adverse outcome after surgery, has gained attention in recent years\(^14\)–\(^15\). Frailty, in this case increased scores \(> 7\) on Edmonton frail scale, have been shown to predict increased complications after non-cardiac surgery (OR = 5.1, 95%CI: 1.55-16.25)\(^16\).

In a larger study included patients undergoing various types of elective surgery frailty was predictive for increased postoperative complications and length-of-stay\(^17\).

Geriatric frailty assessment is a very useful tool for preoperative risk assessment in gastric cancer patients, because gastric cancer is a disease predominantly in the elderly in Western countries and in an ageing population worldwide.

A thorough assessment of frailty can be performed with a comprehensive geriatric assessment (CGA). This employs the use of multiple questionnaires and physical tests and is usually conducted by trained professionals in an outpatient setting. In a CGA, all areas of geriatric frailty are assessed, e.g., cognitive functions, mobility, Activities of Daily Living functioning, mood and nutrition. This is performed by clinical history taking as well as use of multiple questionnaires and tests (e.g., timed get up and to test). Performing is a time and resource consuming effort. Therefore, questionnaires have been developed to assess or screen for presence of frailty in elderly individuals. Questionnaires offer a low-cost, low-effort, low-resource consuming way to gauge levels of frailty in patients. Examples of short questionnaires that have been used in this way in surgical populations include Hopkins Frailty score, Edmonton Frail Scale and Groningen Frailty Indicator (GFI)\(^14\)–\(^16\)–\(^18\). In gastric cancer surgery GFI \(\geq 3\) has been shown to be associated with increased in-hospital mortality, increased serious complications and increased length of stay\(^18\). In this study GFI was independently associated with in-hospital mortality.

Improved risk assessment which includes geriatric frailty assessment can be used to provide a better assessment of operative risks. This can aid the physician to better inform individual patients of their risks and improve shared decision making and informed consent. Geriatric frailty assessment does not aim to exclude patients from treatments rather improve decision making.

In conclusion age and physical status (i.e., ASA classification) do not provide adequate risk assessments especially in elderly patients with gastric cancer. Frailty can provide better estimates of perioperative risks. Evidence seems to suggest that frailty questionnaires provide clinically applicable solutions for frailty assessment.

REFERENCES

1. Dikken JL, van Sandick JW, Allum WH, Johansson J, Jensen LS, Putter H, Coupland VH, Wouters MW, Lemmens VE, van de Velde CJ, van der Geest LG, Larsson HI, Cats A, Verheij M. Differences in outcomes of oesophageal and gastric cancer surgery across Europe. Br J Surg 2013; 100: 83-94 [PMID: 23180474 DOI: 10.1002/bsj.8066]

2. Seo SH, Hur H, An CW, Yi X, Kim JY, Han SU, Cho YK. Operative risk factors in gastric cancer surgery for elderly patients. J Gastric Cancer 2011; 11: 116-121 [PMID: 22076212 DOI: 10.5230/jgc.2011.11.2.116]

3. Takeshita H, Ichikawa D, Komatsu S, Kubota T, Okamoto K, Shiozaki A, Fujiwara H, Otsui E. Surgical outcomes of gastrectomy for elderly patients with gastric cancer. World J Surg 2013; 37: 2891-2898 [PMID: 24081528 DOI: 10.1007/s00268-013-2210-7]

4. Fujiwara Y, Tsujiie M, Hara J, Kato H, Kitani K, Isono S, Takeyama H, Yukawa M, Inoue M, Kanazumi H. Comparison of gastric cancer surgery between patients aged >80 years and <79 years: complications and multivariate analysis of prognostic factors. Hepatogastroenterology 2014; 61: 1785-1793 [PMID: 25513165]

5. Fitz-Henry J. The ASA classification and peri-operative risk. Ann R Coll Surg Engl 2011; 93: 185-187 [PMID: 21477427 DOI: 10.1308/147780811X565070]

6. Koo CY, Hyder JA, Wanderer JP, Eikermann M, Ramachandran SK. A meta-analysis of the predictive accuracy of postoperative mortality using the American Society of Anaesthesiologists’ physical status classification system. World J Surg 2015; 39: 88-103 [PMID: 25234196 DOI: 10.1007/s00268-014-2783-9]

7. Charlson ME, Pompei P, Ales KL, MacKenzie CR. A new method of classifying prognostic comorbidity in longitudinal studies: development and validation. J Chronic Dis 1987; 40: 373-383 [PMID: 3558716]

8. Hsu JT, Liu MS, Wang F, Chung CJ, Hwang TL, Jan YY, Yeh TS.
Standard radical gastrectomy in octogenarians and nonagenarians with gastric cancer: are short-term surgical results and long-term survival substantial? J Gastrointest Surg 2012; 16: 728-737 [PMID: 22350724 DOI: 10.1007/s11605-012-1835-4]

Lübbe T, Mönig SP, Schneider PM, Hölscher AH, Bollschweiler E. [Does Charlson-comorbidity index correlate with short-term outcome in patients with gastric cancer?]. Zentralbl Chir 2003; 128: 970-976 [PMID: 14669119 DOI: 10.1055/s-2003-44805]

Robinson TN, Eiseman B, Wallace JJ, Church SD, McFann KK, Pfister SM, Sharp TJ, Moss M. Redefining geriatric preoperative assessment using frailty, disability and co-morbidity. Ann Surg 2009; 250: 449-455 [PMID: 19730176 DOI: 10.1097/SLA.0b013e3181b45598]

Oresanya LB, Lyons WL, Finlayson E. Preoperative assessment of the older patient: a narrative review. JAMA 2014; 311: 2110-2120 [PMID: 24867014 DOI: 10.1001/jama.2014.4573]

Dasgupta M, Rolfson DB, Stolee P, Borrie MJ, Speechley M. Frailty is associated with postoperative complications in older adults with medical problems. Arch Gerontol Geriatr 2009; 48: 78-83 [PMID: 18068828 DOI: 10.1016/j.archger.2007.10.007]

Makary MA, Segev DL, Pronovost PJ, Syin D, Bandeen-Roche K, Patel P, Takenaga R, Devgan L, Holzmueller CG, Tian J, Fried LP. Frailty as a predictor of surgical outcomes in older patients. J Am Coll Surg 2010; 210: 901-908 [PMID: 20510798 DOI: 10.1016/j.jamcollsurg.2010.01.028]

Tegels JJW et al. Frailty assessment as risk predictor

Saif MW, Makrilia N, Zalonis A, Merkis M, Syrigos K. Gastric cancer in the elderly: an overview. Eur J Surg Oncol 2010; 36: 709-717 [PMID: 20542657 DOI: 10.1016/j.ejso.2010.05.023]

Bi YM, Chen XZ, Jing CK, Zhou RB, Gao YF, Yang LB, Chen XL, Yang K, Zhang B, Chen ZX, Chen JP, Zhou ZG, Hu JK. Safety and survival benefit of surgical management for elderly gastric cancer patients. Hepatogastroenterology 2014; 61: 1801-1805 [PMID: 25436382]

Leo S, Accettura C, Gnoni A, Licchetta A, Giampaglia M, Mauro A, Saracino V, Carr BI. Systemic treatment of gastrointestinal cancer in elderly patients. J Gastrointest Cancer 2013; 44: 22-32 [PMID: 23150086 DOI: 10.1007/s12029-012-9447-5]

Fried LP, Hadley EC, Waldron JD, Newman AB, Guralnik JM, Studenski S, Harris TB, Ershler WB, Ferrucci L. From bedside to bench: research agenda for frailty. Sci Aging Knowledge Environ 2005; 2005: pe24 [PMID: 16079413 DOI: 10.1126/sageke.2005.31. pe24]

Robinson TN, Eiseman B, Wallace JJ, Church SD, McFann KK, Pfister SM, Sharp TJ, Moss M. Redefining geriatric preoperative assessment using frailty, disability and co-morbidity. Ann Surg 2009; 250: 449-455 [PMID: 19730176 DOI: 10.1097/SLA.0b013e3181b45598]

Oresanya LB, Lyons WL, Finlayson E. Preoperative assessment of the older patient: a narrative review. JAMA 2014; 311: 2110-2120 [PMID: 24867014 DOI: 10.1001/jama.2014.4573]

Dasgupta M, Rolfson DB, Stolee P, Borrie MJ, Speechley M. Frailty is associated with postoperative complications in older adults with medical problems. Arch Gerontol Geriatr 2009; 48: 78-83 [PMID: 18068828 DOI: 10.1016/j.archger.2007.10.007]

Makary MA, Segev DL, Pronovost PJ, Syin D, Bandeen-Roche K, Patel P, Takenaga R, Devgan L, Holzmueller CG, Tian J, Fried LP. Frailty as a predictor of surgical outcomes in older patients. J Am Coll Surg 2010; 210: 901-908 [PMID: 20510798 DOI: 10.1016/j.jamcollsurg.2010.01.028]

Tegels JJ, de Maat MF, Hulswé KW, Hooftwijk AG, Stoot JH. Value of geriatric frailty and nutritional status assessment in predicting postoperative mortality in gastric cancer surgery. J Gastrointest Surg 2014; 18: 439-445; discussion 445-446 [PMID: 24420730 DOI: 10.1007/s11605-013-2443-7]

P- Reviewer: Hotta T, Klinge U, Rausi S  S- Editor: Tian YL  L- Editor: A  E- Editor: Lu YJ
