

# Current Status and Problems of Preoperative Assessment for Elderly Cancer Surgery Patients in Japan: A Nationwide Survey

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## Research Article

**Keywords:** Preoperative Assessment, Elderly Cancer Surgery Patients, surgical treatment

**Posted Date:** July 28th, 2021

**DOI:** <https://doi.org/10.21203/rs.3.rs-745631/v1>

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## **Abstract**

Elderly cancer patients requiring surgical treatment are increasing, and the deterioration of quality of life and shortening of healthy life expectancy due to postoperative complications represent major problems. This study investigated the current status of medical treatment, including perioperative evaluations, for elderly cancer patients requiring surgical treatment at cancer treatment facilities nationwide. A total of 436 cancer care facilities around Japan were invited to participate in this web-based survey regarding management of cancer patients  $\geq 65$  years old who had undergone surgical treatment in 2018. A total of 919 department heads from 245 facilities agreed to participate. Although most respondents answered that performance status, preoperative examinations, and comorbidities were important when deciding on a treatment plan, age, Geriatric Assessment (GA), and guidelines were "not important" for  $>10\%$  of all respondents. GA was familiar to 195 department heads (21%), and awareness of GA was significantly lower among respondents from medical education institutions than the other types of hospitals (18.5% vs 26.3%;  $P = 0.006$ ). This large survey revealed that the use of GA is not widespread, and its awareness in medical education institutions remains low. We believe that accumulating evidence of geriatric oncology surgery is an urgent issue in Japan.

## **Introduction**

With the current hyper-aging society present in Japan, mean age at onset of cancer is over 60 years, and 85% of cancer deaths occur in people  $\geq 65$  years old [1,2]. Cancer is already a chronic disease of the elderly, and its treatment and care require the establishment of systems applicable not only to the medical community, but also to society as a whole. Declines in physiological functions, complications, comorbidities, declines in cognitive functions, and socioeconomic limitations such as institutionalization and living alone need to be taken into account when considering treatments in the elderly. These characteristics are thought to impact therapeutic efficacy and adverse events, and personalized medicine after pre-treatment evaluations is thus desirable. In particular, the number of elderly cancer patients requiring surgical treatment is increasing, and deterioration of quality of life (QOL) and shortening of healthy life expectancy due to postoperative complications represent major problems, and the establishment of treatment guidelines for elderly cancer patients is urgently needed.

The most important issue in the treatment of elderly cancer patients is to perform pre-treatment evaluations, but no consensus has yet been reached regarding the optimal methods for such evaluations and little evidence is currently available. Comprehensive Geriatric Assessment (CGA) is a method for comprehensively assessing functional impairment in the elderly [3]. CGA is a concept that combines assessment and intervention, and in oncology is referred to as Geriatric Assessment (GA), in the sense that only a comprehensive assessment is performed to determine a treatment plan [4]. GA is capable of assessing the elderly individual objectively and comprehensively, but is not widely used in daily practice in Japan, especially in cancer treatment. Previously, we have shown that Japanese gynecologic oncology doctors have lower awareness of CGA [5]. For this background, we surveyed the actual status of treatment, including perioperative evaluation, for elderly cancer patients at cancer treatment facilities nationwide to clarify the current status and problems of surgical treatment in elderly cancer care in Japan, and to collect basic data to develop treatment guidelines for elderly cancer patients. This study was conducted as an activity of the "Research on the infrastructure for development of clinical guidelines for elderly cancer patients" group as part of the Research Project for the Promotion of Cancer Control of the Ministry of Health, Labour and Welfare Sciences.

## **Materials And Methods**

This nationwide survey of cancer care facilities was conducted from May to August 2020. Targets of the survey were all 393 designated cancer hospitals by the Ministry of Health, Labor and Welfare (51 prefectural base hospitals for cancer care, 14 regional base hospitals for cancer care (advanced type), 325 regional cooperation base hospitals for cancer care, 1 base hospital for cancer care in a specific area, and 2 National Cancer Centers), and 43 regional base hospitals for cancer care. The following data were collected at a total of 436 facilities (as of April 1, 2019), including 43 regional cancer hospitals, for departments categorized into 12 types (neurosurgery, respiratory surgery, cardiac surgery, gastrointestinal surgery, hepatobiliary surgery, breast surgery, urology, gynecology, orthopedics, otorhinolaryngology/oral oncology, dermatology/plastic surgery, and others) during the year from the beginning of January to the end of December 2018. The survey investigated the management of patients with cancer <sup>≥</sup>65 years old who underwent surgical treatment during the same period. The survey was sent by mail and e-mail to hospital directors of the target facilities, requesting cooperation in the questionnaire, and asking the head of each department to respond via the web.

## **Survey items**

### ***Background characteristics of respondents***

Data requested included: years of experience as a physician; whether the respondent had obtained a medical specialty; whether the respondent had obtained a Ph.D. degree; the types of institution to which the respondent belonged; the specialty of the respondent, and the percentage of elderly treated at each facility.

### ***Do you know and implement the Geriatric Assessment (GA)?***

GA was defined as a method to comprehensively evaluate physical, mental, and social functions.

### ***Items to be evaluated when deciding surgical treatment policy for elderly cancer patients***

We asked respondents to respond to the following 11 items using a 3-point scale of "very important," "important," or "not important: 1) age; 2) performance status (PS); 3) judgment of the anesthesiologist; 4) results of general preoperative examinations; 5) comorbidities; 6) social factors such as institutionalization or living alone; 7) complications of dementia; 8) overall evaluation of the elderly; 9) severity of sarcopenia; 10) guidelines; and 11) family wishes.

### ***Preoperative evaluations performed and what methods of evaluation were used?***

Data on whether the following eight preoperative assessment items were performed and how they were assessed were requested: 1) physical function; 2) comorbidities; 3) medications; 4) nutritional status; 5) cognitive function;

6) depression; 7) social support status; and 8) risk of delirium.

## Statistical analysis

Among the survey items, to examine associations of "presence of GA awareness" with "years of experience as a physician," "whether the respondent had obtained a medical specialty," "whether the respondent had obtained Ph.D.," "the facility to which the respondent belonged," "the specialty of the respondent," and "the annual percentage of elderly treated at each facility," chi-squared tests were used. The level of statistical significance was set at less than 5%. IBM SPSS Statistics 27 (IBM, Armonk, NY, USA) was used for all statistical analyses.

## Ethics

All study protocols were conducted with the approval of The Research Committee of the University of Fukui (approval number 20190123). Since this was a retrospective observational study, the need for written informed consent was waived. Instead of written informed consent, information about this survey was published and participants were given the right to opt out. This survey was conducted in accordance with the Declaration of Helsinki. All methods were performed in accordance with the approved guidelines and regulations.

## Results

We asked each department of the 436 facilities to cooperate in completing the questionnaire, and received responses from 245 facilities (56%), with a total of 941 department heads. Of these, valid responses were obtained from 919 department heads.

## Background characteristics of respondents (Figs. 1–3).

In terms of institutional classifications, 594 (64.6%) department heads belonged to 66 medical education institutions such as university hospitals, 323 (35.2%) belonged to 177 hospitals other than medical education institutions, and one each belonged to a clinic, or government institution or company (including industrial physicians). Gastrointestinal surgery was the most common department, with 122 respondents (13.3%). The average percentages of patients <65 years old, 65–74 years old, 75–84 years old, and ≥85 years old were 36.3%, 32.5%, 25.1%, and 9.0%, respectively. The average proportion of cancer surgery patients ≥65 years old was higher in medical education institutions than other hospitals (66.2% vs 61.4%, p = 0.001).

## GA (Fig. 4, Table 1).

Of the 919 valid responses, 195 department heads (21%) answered they knew about GA. Among those, 103 (11% of the total) answered they were actually performing GA. Furthermore, only 30 respondents indicated that they were implementing GA in all cases.

The chi-squared test was used to examine whether GA awareness was associated with respondent background. Respondents from medical education institutions were significantly less likely to be aware of GA (18.5%) than those from other hospitals (26.3%; P=0.006). This result can be interpreted as meaning that medical education

institutions have a lower awareness of GA. With regard to the relationship between whether a respondent had obtained a Ph.D. degree and GA, the results can be interpreted as indicating that doctors who had obtained a Ph.D. degree were more aware of GA ( $P=0.015$ ). In addition, the more years of experience a physician had, the more likely they were to be aware of GA. No significant relationships were apparent between specialty certification, percentage of institutional elderly treated, and awareness of GA. A significant association was seen between GA awareness and department type ( $P<0.001$ ), with awareness higher in departments of gastrointestinal surgery and urology, and lower in departments of orthopedics and dermatology/plastic surgery. Regarding the implementation of GA, the 103 respondents who answered that they were implementing GA were 47/278 (14.2%) of medical education institutions and 57/538 (9.6%) of other hospitals ( $p = 0.033$ ). Medical education institutions were implementing more GA.

**Table 1**

GA awareness and patient background

	Number of GA recognition	%	P-value
<b>Years of experience as a physician</b>			
1~15	12/81	14.8	0.060
16~20	21/121	17.4	
21~25	43/233	18.5	
26~	119/484	24.6	
<b>Medical specialist</b>	191/894	21.4	0.518
<b>Ph.D. degree</b>	176/778	22.6	0.015
<b>Facilities</b>			
Medical and educational institutions (university hospitals, etc.)	110/594	18.5	0.006
Hospitals (excluding medical and educational institutions)	85/323	26.3	
<b>Percentage of elderly treated</b>			
0-25%.	8/42	19.0	0.695
26-50%.	38/154	24.7	
51-75%.	69/328	21.0	
76-100%.	80/396	20.3	
GA geriatric assessment			

## Items considered important when deciding on a treatment plan (Table 2).

Most respondents answered that most items were "very important" or "important". In particular, >50% of all respondents answered "very important" for PS, preoperative examination, and comorbidities. Social factors such as age, institutionalization and solitary residence, comprehensive evaluation of the elderly, severity of sarcopenia, and guidelines were "not important" for >10% of all respondents. Of these, 25% and 18% chose "not important" for GA and sarcopenia, respectively.

**Table 2**

Questions and answers on surgical treatment decisions for elderly cancer patients

	Very important n (%)	Important n (%)	Not important n (%)
Age	170(18.5)	640(69.6)	109(11.9)
Performance status	685(74.5)	221(24.0)	13(1.5)
Anesthesiologist opinion	380(41.3)	495(53.9)	44(4.8)
Preoperative examination	469(51.0)	437(47.6)	13(1.4)
Complications	575(62.6)	340(37.0)	4(0.4)
Social factor	224 (24.4)	596(64.9)	99(10.8)
Dementia	396(43.1)	481(52.3)	42(4.6)
Geriatric assessment	128(14.0)	555(60.4)	236 (25.7)
Sarcopenia	160(17.4)	593(64.5)	166(18.1)
Guidelines	140(15.2)	670(72.9)	109(11.9)
Wishes of the family	360(39.2)	537(58.4)	22(2.4)

We asked respondents to, "Please select the importance of each of the following assessment items when deciding surgical treatment methods for elderly cancer patients": 1) age; 2) PS; 3) judgment of anesthesiologist; 4) preoperative examination before treatment; 5) complications; 6) social background such as institutionalization or living alone; 7) presence of dementia; 8) overall evaluation of elderly patients; and 8) overall assessment of the elderly; 9) severity of sarcopenia; 10) guidelines; and 11) wishes of the family.

3: Very important; 2: Important; 1: Not important.

## Preoperative assessment items and methods of evaluation (Table 3, Figure 5).

Physical condition and comorbidity were assessed in almost all cases, followed by social support, nutritional status, and cognitive function in >80% of cases. Delirium risk was assessed in 39% of cases, and mood state in 19% of cases. The specific methods of assessment most frequently used for each item were PS for physical function (86%), history taking for comorbidity (99%), body mass index (BMI) for nutritional status (75%), the

revised Hasegawa Dementia Scale (HDS-R) for cognitive function (35%), usual patient background (assessment by nurses on admission) for social support status (86.5%), and confirming a history of agitation and hyperactivity for risk of delirium (32.1%).

**Table 3**

Questions regarding the implementation of each preoperative evaluation item

	Assessed	Not assessed
	n (%)	n (%)
Physical condition	904 (98.4)	15 (1.6)
Confirmation of complications	917 (99.8)	2 (0.2)
Nutritional condition	759 (82.6)	160 (17.4)
Cognition	511 (55.6)	408 (44.4)
Mood	178 (19.4)	741 (80.6)
Social support	808 (87.9)	111 (12.1)
Delirium	362 (39.4)	557 (60.6)

We asked respondents to indicate whether participants performed the following assessments before surgery: 1) physical condition; 2) confirmation of complications; 3) nutritional condition; 4) medication; 5) cognition; 6) mood; 7) social support; and 8) delirium. (Multiple responses accepted)

## Discussion

This is the first large-scale survey to investigate the current status of medical care for elderly cancer surgery patients in Japan. Of these, survey cooperation was obtained from 245 facilities, representing a majority of the 436 facilities nationwide, including high-volume centers for cancer care. The survey revealed that not only is use of the GA not widespread, but awareness of GA also appears to be declining in medical education institutions. At the same time, the physical aspects of GA, such as assessment of physical functions and comorbidities, were widely conducted in each department with a common understanding, but assessment of nutritional status, cognitive functions, emotions/moods (depression, delirium), and social/economic status were not conducted sufficiently, and implementation varied among departments. There are several possible factors that contributed to the differences in awareness and implementation of GA between medical education institutions and other hospitals. First, the implementation of GA to oncologic surgery in Japan has a strong research aspect. Some university hospitals in Japan are conducting clinical research of GA, and preoperative GA is routinely performed on a facility basis. Secondly, university hospitals, which are medical education institutions, tend to have very high specialties in each clinical department, and generally there are few opportunities to hold joint conferences with internal medical departments. Compared to university hospitals, small-scale community hospitals are expected to hold more multidisciplinary and other occupational conferences, which may contribute to raising awareness of GA. In addition, as the background of the respondents, the response rate other than medical education institutions was about half that of medical education institutions. Thus, some of the department heads other than medical

education institutions who participated in this survey may include a larger group of more interested in geriatrics, which may raise awareness of GA.

The physiological functions of various organs decline in the elderly, and their ability to tolerate treatment is reduced due to the presence of many comorbidities. Both of these factors tend to increase and prolong treatment-related complications. However, with the aging of the patient population and accompanying advances in perioperative management, anticancer pharmacotherapy, radiation therapy, and their supportive care, the indications for treatment of the elderly in the field of oncology are also expanding. In addition, the National Comprehensive Cancer Network (NCCN) guidelines for the treatment of cancer in the elderly advocate that elderly patients with good general health should not be excluded from treatment simply because of age, as they can be expected to experience the same therapeutic effects as non-elderly patients [6]. However, standard surgical treatment of patients with Vulnerable and frail increases the risk of postoperative adverse events [7]. Therefore, preoperative evaluation of elderly cancer patients should not be performed in the same way as non-elderly patients.

The treatment decisions are presumably often made based on the subjective judgment of the attending physician due to a lack of clear indicators. In planning surgical treatments for cancer in the elderly, a dilemma exists between improvements in oncological prognosis that can be achieved by standard treatment and the increased complications and decreased QOL. In addition, social factors such as institutionalization and living alone come into play, along with cognitive declines, all of which complicate the selection of standard treatments and optimal techniques for elderly patients. The NCCN, European Society of Medical Oncology, and Japanese guidelines for the treatment of solid tumors in various fields do not state whether surgical treatment for the elderly is acceptable [8,9]. In a survey conducted by the International Society of Geriatric Oncology (SIOG), 80% of surgeons responded that cancer surgery has no definitive age limits [10]. Elderly cancer patients can be considered for the same treatment as non-elderly cancer patients. In order to make such decisions, we believe that conducting preoperative evaluations based on GA that can identify problems specific to elderly patients is important.

However, the lack of high-quality studies that have verified the usefulness of GA in elderly cancer surgery patients, there are currently no guidelines recommending GA as a preoperative evaluation. In 2017, Huisman et al. compiled nine systematic reviews of GA in elderly cancer surgery patients. All GA domains except polypharmacy are associated with postoperative adverse events and prognosis, and in particular, the domain of PS and comorbidities and the evaluation of frailty by GA tools are important for prognosis prediction [11]. Although GA observational studies and case control studies in elderly cancer surgery patients are increasing, differences in study population background, selection bias, surgical techniques and evaluation tools used, and endpoint settings make it difficult to build the evidence. In such a situation, four randomized control studies as new evidence for GA were reported at the ASCO 2020 annual meeting [12-15]. Three of the four studies were chemotherapeutic studies and the remaining was a surgical study; all showed the usefulness of the GA.

Although the utility of GA has been recognized, one reason for its lack of widespread adoption may be that it is considered impractical due to the complexity of the assessment items. The SIOG has proposed simple screening methods such as the Geriatric-8, the Flemish version of the Triage Risk Screening Tool, and the Vulnerable Elders Survey-13 [16]. The fundamental problem, however, may be a lack of recognition about the importance of geriatrics. This is an issue that goes to the core of the legal system, geriatric education, and lifelong learning in a

nation such as Japan. This survey revealed that awareness of GA is declining in medical education institutions in Japan, and there is room for intervention.

Medical education in Japan has long been considered to be lagging behind that of Western countries. [Nishijima](#) et al. clarified the current status of lack of geriatric medicine education in Japan [17]. In particular, due to the historical background of medical care being developed for emergency and specialty care, education in the field of geriatrics has lagged well behind, and medical care adapted to the elderly has often been thought to have been given insufficient consideration. Especially in Europe and the United States, the importance of geriatrics has long been recognized and is being reflected in actual clinical practice. In France, legislation has been established to support the lives of the elderly, and in addition to the development of a geriatric education system, a network for the treatment of the elderly has been established, consisting of geriatric outpatient clinics, day hospitalizations, geriatric support teams, acute care wards, and recovery hospitals. In the United States, a department of geriatrics has been established in basically all university hospitals, and comprehensive medical care is provided by a team consisting of various professionals specializing in geriatrics. On the other hand, only about 30% of universities in Japan have geriatric medicine departments, and education is in reality provided by a mixture of several fields [17]. As a step toward developing approaches to cope with the super-aging society in Japan, the 2016 revision of the Model Core Curriculum for Pre-Graduate Medical Education included many geriatrics education topics, such as theories of aging, CGA, geriatric syndromes, frailty, sarcopenia, and end-of-life care. In addition, education and clinical practice in team medicine and community-based comprehensive care have been emphasized [18]. Such measures are expected to lead to further developments in geriatrics education, but to ensure their widespread use, establishment of geriatrics courses is desirable at each medical education institution to train the next generation of human resources.

The strengths of this research is that it is the first large-scale research in Japan targeting surgical departments. Secondary, there is little regional difference, and responses are obtained from the majority of facilities including the city centers and rural areas. Third, we were able to minimize data loss by refining the web response system. As a limitation, first, there was a large difference in the number of respondents between medical education institutions and other hospitals. In particular, respondents from hospitals other than medical institutions may include more doctors working on geriatric oncology, which may have caused a statistically significant difference in GA awareness. Secondly, the real respondents may not have been each department head. Although this study requested a survey of each department head at each institution, another doctor representing the department may responded without the intention of the department heads. There is a possibility that the number of years of experience as a doctor and the PhD acquisition rate do not accurately reflect the data of the department head. Third, GA implementation and postoperative outcome have not been examined. In order to clarify this, more detailed survey is required, which puts a heavy burden on the respondents. Since the purpose of this research was to investigate the current state of preoperative evaluation for elderly cancer patients, postoperative outcome was not set as a survey item.

In conclusion, this large questionnaire survey on the current status and problems of elderly cancer surgery patients in Japan revealed not only that GA is not widespread, but also that the level of awareness of GA in medical education institutions is low. The practice of geriatrics and its education seem to be in question. To address this situation, accumulation of evidence on the treatment of elderly cancer patients in Japan and establishment of treatment guidelines are urgent tasks. Based on the present results, the relationship between GA and postoperative

prognosis for elderly cancer surgery patients needs to be verified in Japan to establish appropriate methods of pretreatment evaluation for elderly cancer patients.

## Declarations

## Acknowledgements

The authors would like to thank Ms. Noriko Ikoma and Yukie Nishibata for secretarial work. The authors are deeply grateful to the participating institutions for taking the time to complete the survey and give us valuable comments.

## Funding

This work was supported by the Health and Labor Sciences Research Grant of the Ministry of Health, Labour and Welfare of Japan [grant number 30050501].

## Conflict of interest statement

All authors have no conflict of interests.

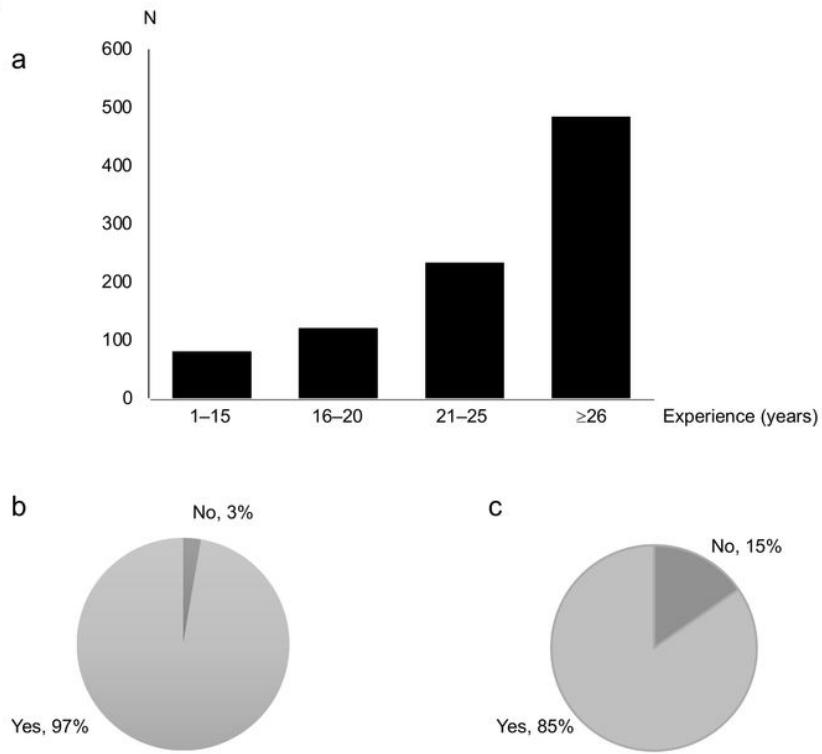
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## Figures

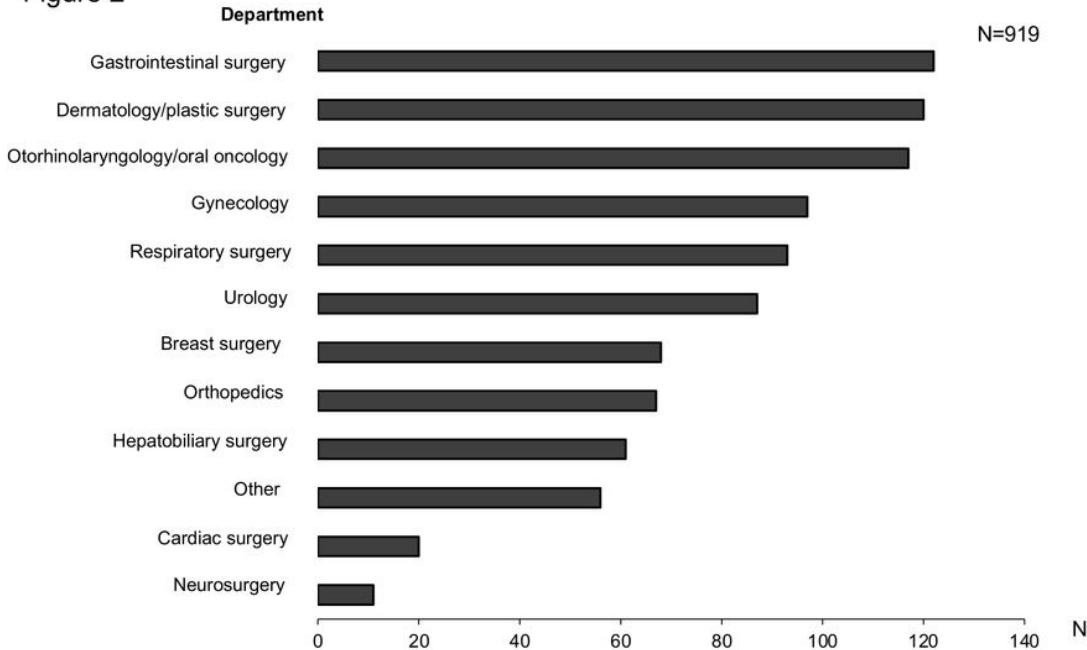
**Figure 1**



**Figure 1**

Background characteristics of respondents a) Number of years of experience as a physician. Vertical axis: number of people; horizontal axis: number of years of experience as a physician. b) Qualification as a medical specialist: Yes / No. c) Medical doctor: Yes / No.

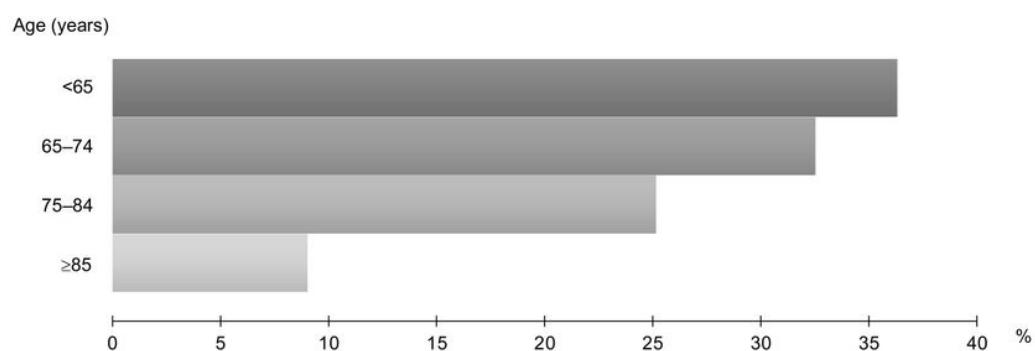
**Figure 2**



**Figure 2**

Number of responses by department Vertical axis: order of departments with largest number of responses; horizontal axis: respondents.

**Figure 3**



### Figure 3

Questions and answers regarding numbers of surgical patients Number of surgical (malignancy) patients (January 2018 to December 2018). What is the percentage of each of the following four items (1) through (4), when the total is 100%? Please indicate approximate percentages (%). 1) Number of elderly cancer patients aged <65 years who underwent malignant tumor surgery (%). 2) Number of elderly cancer patients aged 65–74 years who underwent malignant tumor surgery (%). 3) Number of elderly cancer patients aged 75–84 years who underwent malignant tumor surgery (%). 4) Number of elderly cancer patients aged ≥85 years who underwent malignant tumor surgery (%).

Figure 4

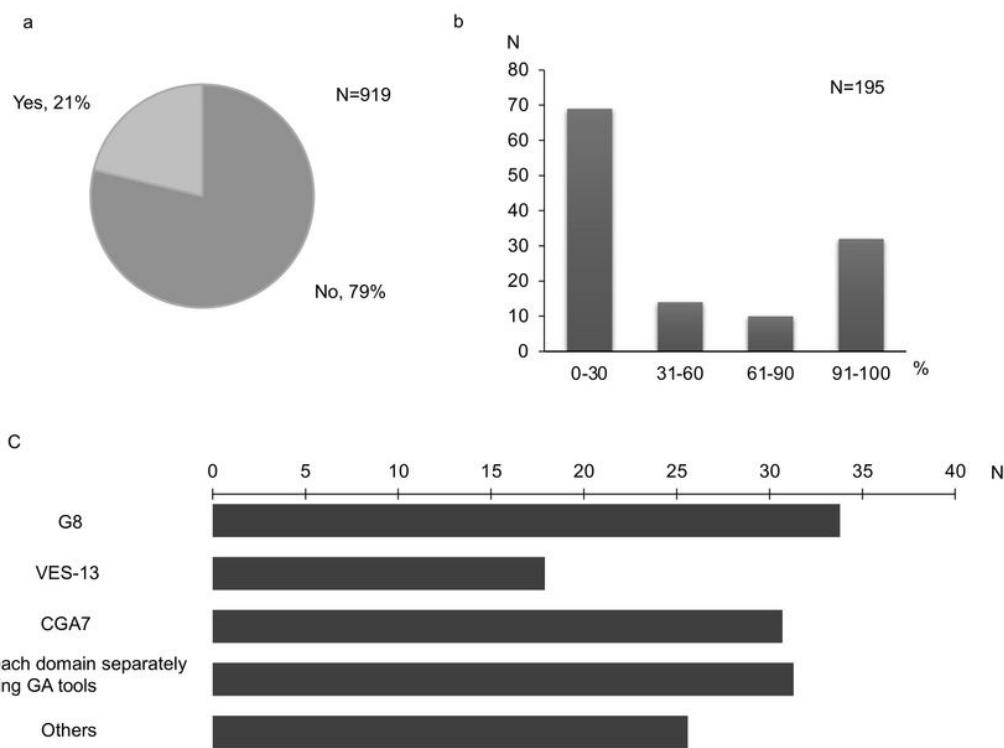


Figure 4

GA recognition and implementation rates, and assessment tools a) GA recognition rate. b) GA implementation rate. c) GA evaluation tools. (Multiple responses accepted) GA geriatric assessment

Fig.5

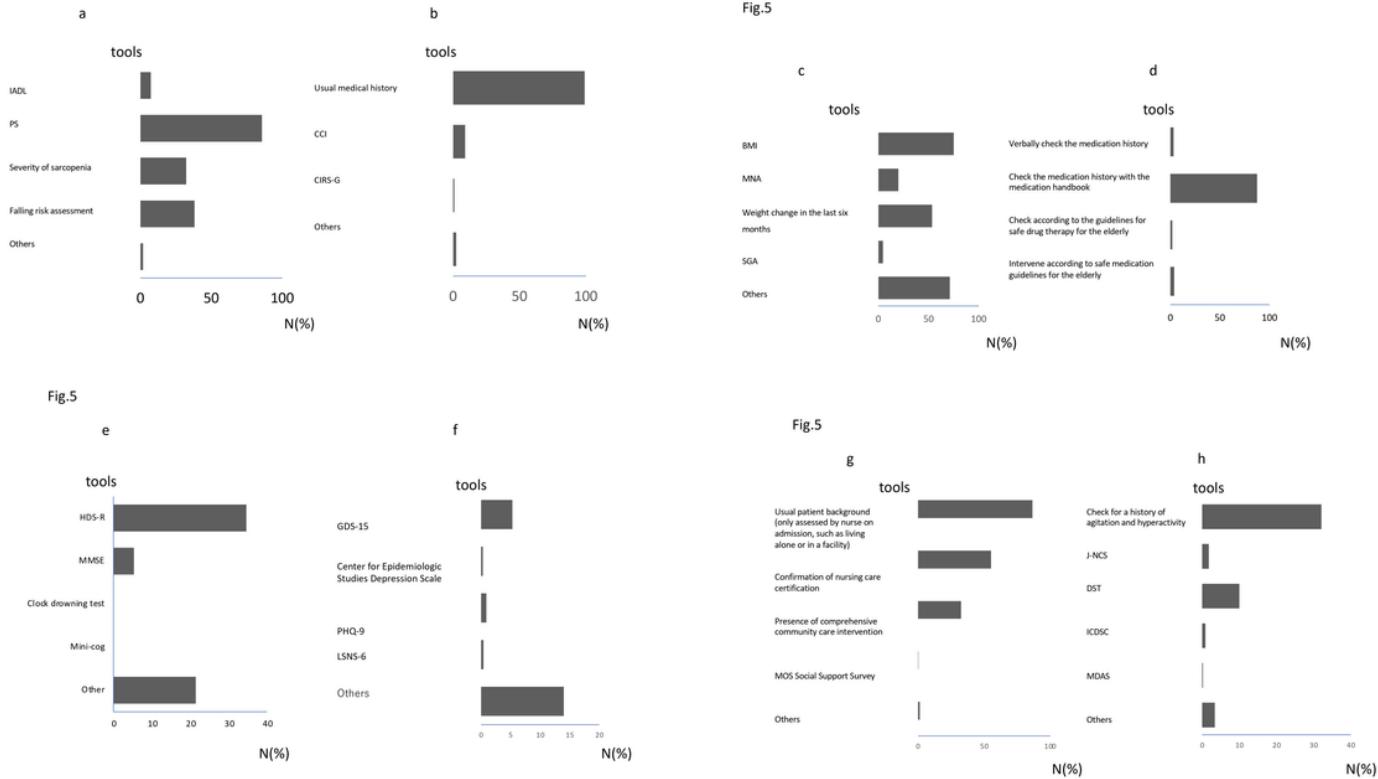


Figure 5

Evaluation tools for each preoperative evaluation item We asked about the detailed evaluation methods for each preoperative evaluation item. (Multiple responses accepted) a) Do you use specific tools to check the physical condition of patients before surgical treatment? b) Do you use specific tools to check the complication status of patients before surgical treatment? c) Do you use specific tools to check the nutritional status of patients before surgical treatment? d) Do you use specific tools to check the medication status of patients before surgical treatment? e) Do you use specific tools to check the cognitive status of patients before surgical treatment? f) Do you use specific tools to check the mood of patients before surgical treatment? g) Do you use specific tools to check the social support status of patients before surgical treatment? h) Do you use specific tools to confirm the predicted disease onset before surgical treatment? IADL instrumental activities of daily living; PS performance status; CCI Charlson comorbidity index; CIRS-G cumulative Illness rating scale-geriatric; BMI body mass index; MNA mini nutritional assessment; SGA subjective comprehensive assessment; HDS-R Hasegawa's dementia scale-revised; MMSE mini-mental state examination; GDS-15 geriatric depression scale-15; PHQ-9 patient health questionnaire 9; LSNS-6 Lubben social network scale-6; MOS medical outcomes study; JNS Japanese version of the NEECHAM confusion scale; DST delirium screening tool; ICDSC intensive care delirium screening checklist; MDAS memorial delirium assessment scale