Perspectives on how to navigate cancer surgery in the breast, head and neck, skin, and soft tissue tumor in limited-resource countries during COVID-19 pandemic

by Wirsma Arif Harahap 3

Submission date: 16-Jun-2020 03:29PM (UTC+0800)
Submission ID: 1344719940
File name: 1-s2.0-S1743919120304556-main.pdf (589.91K)
Word count: 7103
Character count: 42110

International Journal of Surgery 79 (2020) 206–212

Contents lists available at ScienceDirect

International Journal of Surgery

journal homepage: www.elsevier.com/locate/ijsu

Perspective

Perspectives on how to navigate cancer surgery in the breast, head and neck, skin, and soft tissue tumor in limited-resource countries during COVID-19 pandemic

Sumadi Lukman Anwar[a,*], Wirsma Arif Harahap[b], Teguh Aryandono[a]

[a] Division of Surgical Oncology - Department of Surgery, Dr Sardjito Hospital / Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Yogyakarta, 55281, Indonesia

[b] Division of Surgical Oncology – Department of Surgery, Dr M. Djamil Hospital / Faculty of Medicine, Universitas Andalas, Padang, 25217, Indonesia

ARTICLE INFO

Keywords:
COVID-19
Cancer surgery
Developing countries
Limited-resource countries

ABSTRACT

The rapidly spreading coronavirus infection (COVID-19) worldwide has contracted all aspects of health systems. Developing countries that mostly have a weaker healthcare system and insufficient resources are likely to be the most hardly affected by the pandemic. Cancers are frequently diagnosed in late stages with higher case-fatality rates compared to those in high-income countries. Delayed diagnosis, lack of cancer awareness, low adherence to treatment, and unequal or limited access to treatment are among the challenging factors of cancer management in developing countries. Elective cancer surgeries are often considered to be postponed during COVID-19 pandemic to preserve valuable hospital resources such as personal protection equipment, hospital bed, intensive care unit capacity, and manpower to screen and treat the affected individuals. However, specific considerations to defer cancer surgery in developing countries might need to be carefully adjusted to counterbalance between preventing COVID-19 transmission and preserving patients 'long-term life expectancy and quality of life.

1. Introduction

COVID-19 outbreak that began in Wuhan, China at the end of 2019 has spread all over the world [1]. Developing countries are facing higher risk for community transmission because of a lack of preparedness and national response plan as well as a weaker health system to contain the virus transmission and to treat the affected population [2,3]. Each country responds variably and applies different strategies in battling the coronavirus crises [4,5]. Rapid and coordinated responses from government, non-governmental bodies, and community are key players to contain the virus transmission [2,4]. However, the alarming speed of COVID-19 transmission has affected the integral framework of health systems beyond the disease origin itself [6]. The contracted health systems have to cope with the strain of resources due to specific allocation to manage the COVID-19 pandemic.

Low- and middle-income countries (LMICs) including Indonesia have faced remarkable challenges in managing cancer surgery even before the pandemic [7]. The burden for cancer diagnosis and surgery has already been relatively high due to the limited number of health facilities, lack of human resources, and unequal distribution across the country [7–9]. Due to the pandemic, large proportion of the resources have to be allocated for the prevention and treatment of people affected by COVID-19 [6]. As a result, cancer management is also affected by the pandemic. Diagnostic procedures and cancer surgery will be limited only for essential surgery as hospitals have to reserve manpower, personal protective equipment (PPE), hospital beds, ventilators, and intensive care unit capacity for treatment of critically ill COVID-19 patients. Therefore, triage of elective cancer surgery is very important to prioritize patients that will take the highest benefit of urgent surgery. Although prioritization is performed, the load for cancer surgery might be still high in LMICs because more than 70% of patients are presented in late stages [7] and delayed treatment for 4–8 weeks might significantly affect patients' long term prognosis [10]. Cancer patients who have been referred to a tertiary hospital for further treatment might not be abrupted or stopped without any significant adverse outcomes. Halting these patients might also cause loss of treatment and follow-up.

Cancer patients are also among the vulnerable population to be affected by the COVID-19 because they are generally older age and are frequently having metabolic and cardiovascular comorbidities [11]. Patients who are under cancer treatments including chemotherapy,

* Corresponding author. Division of Surgical Oncology - Department of Surgery, Dr Sardjito Hospital / Faculty of Medicine, Public Health, and Nursing, Universitas Gadjah Mada, Jl Kesehatan No. 1, Yogyakarta, 55281, Indonesia.
E-mail address: sl.anwar@ugm.ac.id (S.L. Anwar).

https://doi.org/10.1016/j.ijsu.2020.05.072
Received 6 May 2020; Received in revised form 23 May 2020; Accepted 27 May 2020
Available online 01 June 2020
1743-9191/

radiotherapy, immunotherapy, bone marrow, or stem cell transplantation are also at high risk due to depression of the immune system [11]. Maintaining services of cancer surgery involving the preparation, performing surgery, and postoperative care is currently under a high risk of COVID-19 transmission given surgery needs multiple staffs and involves procedures causing airway management during anesthesia and postoperative care [12]. The strain of cancer surgery service during the COVID-19 pandemic is weighed by the high prevalence of cancer that frequently presents in late stages, limited cancer core facilities, under pressure health workers, resource shifting allocation to treat virus outbreak, and greater risks of virus transmission among patients and health workers. It is, therefore, necessary for cancer surgeons to act immediately to support the health systems by maintaining particular essential cancer surgeries while protecting patients and other health workers from virus transmission and conserving the valuable amid limited hospital and health resources. Although the World Health Organization (WHO) and specialized societies have provided recommendations and guidelines, adjustment to the complexity of regional challenges and the available resources is required to implement the policies. We highlight challenges, considerations, and potential interventions to maintain or delay scheduling cancer surgery in the breast, head and neck, skin, and soft tissue tumors particularly in regions with limited health resources.

2. Challenges in maintaining cancer surgery care during COVID-19 pandemic

In the crisis of an infectious outbreak, there are some additional challenges specific to cancer surgery that should be carefully evaluated:

1. The window period of diagnosis and definitive cancer surgery. Delaying surgery procedures both for diagnosis and treatment particularly for aggressive cancer might adversely worsen the long-term outcomes. For example, postponing cancer surgery by 30 days and chemotherapy by 120 days in patients with breast cancer were associated with shorter survival rates [10,13].
2. The complexity of the referral system for cancer diagnosis and treatment in developing countries is often associated with delayed cancer management. Surgery procedures such as core, *tru*-cut, or open biopsies are required to establish a definitive diagnosis of solid tumors. Postponing all elective surgery procedures might significantly heighten the existing delayed diagnosis and treatment.
3. Cancer surgery requires meticulous planning for staging, surgery design, and reconstruction. As non-essential surgeries are postponed, the load is expected to decrease. However, completing the existing scheduled surgeries will take time until the routine clinical workload decreases during the pandemic.
4. Patients who visit the surgical oncology department should be divided into outpatient follow-up, hospital inpatient control, diagnostic review, and treatment review. Careful consideration should be made to minimize contact among patient groups.
5. Triage in the outpatient clinics should segregate high-risk patients having fever, cough, or history of contact
6. Human resources of surgeons, nurses in both outpatient inpatient clinics, operating theatre, as well as allied health assistance should be well managed to protect them from virus infection and to prevent burn out.
7. Cancer surgeons have to consider and manage shortages in the blood supply and medical supply during the pandemic

According to hospital and professional organizations, oncology care, particularly in tertiary referral hospitals is expected to be maintained amid the coronavirus outbreak. From the patients oint of view, cancer treatment should be continued because they want their treatment schedule not to be disrupted.

2.1. Considerations to maintain surgical oncology service

To continue surgical oncology service, there are some considerations should be deliberately appraised:

2.1.1. Prioritization for essential or urgent surgery

The benefits and risks of cancer surgery must be carefully assessed to ultimately protect patients, health professionals, and society from potential transmission. Cancer surgery particularly surgery in the respiratory tract, oropharynx, and upper alimentary systems might predispose healthcare workers to the virus exposure. We listed essential cancer surgery procedures according to cancer types that might guide surgeons particularly in developing countries to perform triage and prioritization in Table 1.

2.1.2. Health workers/surgical team members

Healthcare workers are at high risk to be affected by virus transmission during the outbreak [14]. Undertaking surgery in asymptomatic and prodromal COVID-19 patients or those in the incubation period could cause a disastrous outbreak among healthcare workers [14]. When social distancing is implemented to limit COVID-19 spreading, cancer surgery service will still need hospital admission and close contact of surgeons-patients, surgeons-health workers, and patients-health workers for days or week(s). In addition, no sufficient evidence is recommending appropriate personal protective equipment (PPE) to prevent virus transmission during cancer surgeries especially for surgery with prolonging aerosol-generating procedures (AGPs) [15]. Several guidelines recommend N95 respirators for surgery with shorter AGP such as tracheostomy [15,16]. However, the use in surgeries with prolonging AGP is not yet established [17]. The CDC's specifically recommends that the healthcare workers who are in the same room with known or suspected COVID-19 patients should wear N95 or higher-level respirators [17]. Experience during the SARS outbreak in 2003, N95 respirators remained the minimum level of protection of health care workers performing AGP [18]. Health providers working in severely affected regions used higher levels of protection including PAPRs for AGP [18]. Further evidence is required to measure the effective protection of N95 for healthcare workers involved in cancer surgery.

Because population outreach for tracing, testing, and treatment are generally lacking in developing countries, the appropriate PPE required to perform cancer surgery in unscreened, inadequately tested of asymptomatic, or false negative-tested symptomatic patients is still questionable. N95 in addition to droplet PPE (gown, gloves, eye protection) are regarded as minimum protection for all staff members in surgeries involving exposure of upper aerodigestive tracts [15]. Inappropriate levels of PPE might put operating room staff and healthcare workers in a perioperative ward into a higher risk of COVID-19 transmission [17]. In cancer surgeries involving tracheostomy or cricothyroidotomy that require routine suctioning and daily care, the risks of COVID-19 transmission for healthcare workers in perioperative care will be higher.

Although there is an increased risk of COVID-19 among healthcare personals, nosocomial transmission rates are reported around 4–7% [19,20]. A much larger proportion of COVID-19 was reported from the community and household transmission [20] unlike the SARS outbreak outside China in 2003 that was transmitted predominantly in hospital [21]. Higher risks COVID-19 transmission among healthcare workers are associated with unprotected and extended patient contact, as well as being involved in the physical examination and nebulizer treatment [22]. Several measures to limit transmission to healthcare workers in limited-resource setting are screening for all hospital visitors, usage of recommended protective equipment, medical leave and surveillance for all staffs with respiratory symptoms, team separation of hospital staffs caring for COVID-19 patients, as well as designed and segregated areas within the hospital for COVID-19 clean and contact.

Routine testing for staff and healthcare workers every 2–4 weeks is

Table 1
Stratification, prioritization and triage cancer surgery according to tumor types, intrinsic pathological characteristics and stage at diagnosis and adapted considerations from Society of Surgical Oncology [29] to defer cancer surgery in response to COVID-19 pandemic in a limited-resource health setting.

Cancer Sites	Urgent	Less urgent	Least urgent
Breast cancer	Locally advanced breast cancer after finishing neoadjuvant chemotherapy TNBC or Her2-enriched subtypes Node positive of Luminal-A and -B Discordant biopsy probably malignant Resectable recurrence breast cancer Incision drainage of abscess Revision/revascularization of an ischemic flap	Cancers with a pathological complete response with neoadjuvant chemotherapy or hormonal therapy High-risk lesions (atypical ductal papilloma) In situ ductal carcinoma Luminal-A subtype Stage I	Excision of benign lesions Prophylactic or risk-reducing mastectomy
	Specific considerations for breast cancer surgery Delaying surgery up to 3 months for atypia lesions, prophylactic mastectomy, reconstruction, and benign breast lesions. Ductal carcinoma in situ (DCIS) - Can be postponed for 3–5 months with careful patient education - Start treatment with endocrine therapy for DCIS with estrogen receptor (ER) positive - Monitoring and follow up monthly to observe the progression - ER-negative DCIS is a priority for surgery Stage I-III ER-positive Invasive Breast Cancer - Start treatment with endocrine or chemotherapy in a neoadjuvant fashion after discussion in tumor board - Careful monitoring for neoadjuvant response Triple-Negative and Her-2 enriched invasive breast cancer - Start treatment with neoadjuvant chemotherapy for T2, T3, T4 and or axillary node-positive cancer - Primary surgery can be urgently performed if there is contraindication for a chemotherapy or if the tumor is small or surgery will provide additional information for chemotherapy Post-neoadjuvant chemotherapy - Surgery after neoadjuvant chemotherapy can be delayed for 4–8 weeks if the pathological complete response and if further adjuvant systemic therapy is not indicated. - Partial response after neoadjuvant chemotherapy might be considered for cancer surgery. Progressive diseases and unusual cases Patients with unresponsive cases on systemic therapy, malignant phyllodes tumor, angiosarcoma should be prioritized for urgent surgery without a delay.		
Thyroid lesion	Anaplastic thyroid carcinoma Medullary thyroid carcinoma Large follicular neoplasm (> 4 cm) Papillary thyroid cancer with suspicious or identified metastatic lesions Locally aggressive papillary thyroid cancer	Low-risk papillary thyroid cancer without metastasis	Goiter without airway compromise Benign colloid thyroid nodules and thyroiditis Papillary thyroid cancer with stable or slow rate progression
	Specific considerations for thyroid surgery: - Thyroid cancer presents with impending airway obstruction, local invasion to trachea, recurrent laryngeal nerve, aggressive behavior (recurrence, rapidly growing, and progressive locoregional invasive tumors) - Graves' s diseases present with severe cardiovascular symptoms with limited response to medical treatment - Highly symptomatic goiters present with impending airway obstruction or locoregional extension - Biopsy procedure as a diagnostic procedure for suspected anaplastic thyroid cancer and lymphoma		
Parathyroid tumor	Parathyroid gland tumor with deteriorated renal function or pathologic bone fractures	Parathyroid gland tumor with compromised renal function	
	Specific considerations for parathyroid tumor: - Parathyroid tumors present with life-threatening hyperparathyroidism including hypercalcemia and pathological bone fractures that do not respond to medical treatment - Parathyroid tumors with attenuation of renal function should be prioritized		
Skin cancer	Melanoma > 2 mm thickness Merkel cell carcinoma Advance stage, high-risk cutaneous cell carcinoma Basal cell carcinoma in a critical area (orbit)	Basal cell carcinoma with slow growth without any cosmetic or morbidity impact Low-risk squamous cell carcinoma	
	Specific considerations for melanoma - For in situ melanoma and lesions with negative surgical margin in the initial surgery, delay up to 3 months could be considered if the hospital resources get scarce. However, proper documentation of location and follow up assessment have to be performed to facilitate definitive surgery in the future. - Priority for essential surgery should be given to melanomas with T3/T4 (> 2 mm thickness) at first presentation and melanomas that are partially removed, positive surgery margin, and large residual lesions. - Immune checkpoint inhibitors and targeted therapy are largely not available in developing countries. If therapy is available, stage III melanomas could be considered neoadjuvant systemic therapy or for resection in the absence of neoadjuvant treatment. Surgery in metastatic melanomas should be postponed except in the manifestation of critical symptoms or resistant to systemic therapies. For large tumors or if the capacity for surgery is very limited, single-dose radiotherapy could be performed to reduce critical symptoms.		
Soft tissue sarcoma	Primary sarcoma, particularly with high grade, larger than 5 cm, deep location Recurrence sarcoma High chance for complete excision Sarcomas with active bleeding, locally destructive, and symptomatic Sarcoma without other options of neoadjuvant chemotherapy	Classic dermatofibrosarcoma, atypical lipomatous tumor, and desmoid tumor Low-grade and well-differentiated indolent sarcomas (myxoid liposarcoma, low-grade fibromyxoid sarcoma) Re-excision of margin free less than 1 mm	
	Specific considerations for soft tissue sarcoma - Primary soft tissue sarcoma without distant metastasis at diagnosis should be considered for surgery - Surgery for classic dermatofibrosarcoma, atypical lipomatous tumor, and a desmoid tumor can be postponed for 3 months - Surgery deferral could be considered in the absence of symptoms and lack of hospital resources for low-grade and indolent sarcomas (for example retroperitoneal well-differentiated liposarcoma) and low risk of distant metastasis (for example myxoid liposarcoma and low-grade fibromyxoid tumor). - Re-excision of a residual tumor with 1 mm of margin (R1) in extremity or truncus could be postponed if hospital resources are limited		

(*continued on next page*)

Table 1 (*continued*)

Cancer Sites	Urgent	Less urgent	Least urgent
	- For soft tissue sarcomas that are sensitive to radiation, preoperative radiotherapy is suggested through an outpatient clinic and might able to delay surgery for 3–4 months. - For high-grade sarcomas, neoadjuvant chemotherapy for any site or recurrent sarcomas is preferred if it can be administrated in outpatient service as a bridging therapy to defer surgery. - Neoadjuvant imatinib could be considered for localized GIST and dermatofibrosarcoma protuberans with positive mutations as a bridge therapy before surgery. - Surgery of recurrence soft tissue sarcoma could be considered in patients with ➢ high probability for complete excision and long-term disease control (solitary site of locoregional recurrence, long-term overall survival) ➢ urgent need for palliative surgery due to active bleeding, obstruction, limb-sparing aggressive behavior soft tissue sarcomas in which bridging therapy and active observation are not possible		
HNSCC	Stage I-III HNSCC if chemotherapy and/ radiotherapy are not possible After finishing radiotherapy, induction and concomitant radiotherapy and chemotherapy	Complete response HNSCC to radiotherapy or concomitant radiotherapy and chemotherapy	
	Specific considerations for head and neck squamous cell carcinomas (HNSCCs) Particularly for mucosal squamous cell carcinomas in the upper aerodigestive tracts (HNSCC), both non-surgical treatment and surgical procedures can be adopted as the first choice. Therefore, during the COVID-19 outbreak, a multidisciplinary discussion has to be performed for possible alternative nonsurgical treatment using radiotherapy with or without concurrent chemotherapy. Because most HNSCCs in developing countries are diagnosed in advanced stages, the initiation of definitive diagnosis and prompt treatment should be achieved without a delay to compromising the patients' oncological outcomes. Some considerations regarding the treatment of HNSCCs during COVID-19 pandemic - Excluding systemic chemotherapy for patients older than 70 years old and younger patients with metabolic comorbidities including hypertension, diabetes, chronic lung diseases, and other cardiovascular diseases. These patients are considered for radiotherapy. - If resources of cancer surgery are strained, radiotherapy or concomitant radiotherapy and chemotherapy could be considered for cancers traditionally treated with primary surgery and all locoregional advanced HNSCC including Oral SCC T2-3N0-2M0, laryngeal SCC T4aN3M0, and sinonasal maxillary SCC T4aN1M0 [34]. - Urgent initiation with radiotherapy (using hypofractionation) for oropharyngeal SCC T2N1-2M0, Laryngeal SCC T3N1M0, oral cavity SCC T2N2M0 with positive margins, and palliative radiotherapy for hypopharyngeal SCC T4N1M1 with obstruction and bleeding [34] - Considering concomitant chemotherapy and radiotherapy, particularly with weekly 30–40 mg/m^2 an cisplatin in outpatient setting - Induction of chemotherapy should not be considered to delay the initiation of treatment - Surgery for locally and locally advanced HNSCC should not be delayed 2–3 months after initial treatment with radiotherapy and/or with concomitant chemotherapy. - More complex surgeries especially those involving plastic reconstruction should be deterred. If complex reconstructive procedures are required to preserve patient's functioning and long-term survival, considerations regarding decisions, estimated operative times, length of hospital stay, and the current situation of hospital resource shortage should be carefully planned.		
Salivary gland cancer	Salivary duct carcinoma High-grade mucoepidermoid carcinoma Adenoid cystic carcinoma Carcinoma ex pleomorphic adenoma Other high-grade salivary cancer	Low-grade salivary carcinoma: Acinic cell carcinoma Basal cell adenocarcinoma Cystadenocarcinoma	
	Specific considerations for salivary gland tumors - Consider surgery in the first place for high-grade salivary cancer including: ➢ Salivary duct carcinoma ➢ High-grade mucoepidermoid carcinoma ➢ Carcinoma ex pleomorphic adenoma ➢ Acinic cell carcinoma ➢ Other high-grade salivary cancer - In the very strained service for cancer surgery, neoadjuvant radiotherapy might be considered.		

ideally required to prevent hospital transmission [14]. However, testing for all healthcare workers is considered not always useful. Because the capacity for testing is limited in LMICs, a routine test should be prioritized to high exposure risk workers who directly treat COVID-19 patients and who perform aerosol-generating procedures. Shifting allocation for healthcare workers in duty should be considered to reduce the need for routine testing.

2.1.3. Cancer patients

Cancer patients are at an increased risk for COVID-19 infection. A report from China revealed an increased risk of COVID-19 infection, ICU admission, and mortality in patients with a history of cancer [23]. Most cancer patients are elderly with multiple comorbidities such as obesity, diabetes, hypertension, coronary disease, and chronic pulmonary diseases [11]. In addition, acute cancer treatment could adversely affect the immune system [11]. Newly diagnosed cancer patients referred from lower levels of hospital care might escape COVID-19 screening to have cancer surgery while bearing an asymptomatic or prodromal phase from community transmission. In contrast, negative COVID-19 patients will also be at risk of hospital transmission through direct contact, droplet, or airborne spread during an outpatient visit, surgery, and perioperative care. Acquired COVID-19 infection from both community and hospital has been associated with poor surgery outcomes with increased rates of mortality up to 22.5% [24].

To diminish COVID-19 inside hospital transmission, a very stringent visitor policy must be enforced [14]. Only one accompanying person per patient should be permitted during outpatient and perioperative care. Children should not be allowed to enter the hospital except for indispensable medical tests or treatment [14]. Double layers of triage involving temperature monitoring and a questionnaire of the presence of fever, cough, shortness of breath, contact with COVID-19 patients, and history of traveling to the hot-spotted area should be implemented to patients and associated healthcare workers [14]. Any positive findings in the triage should be reported and isolated to further proceed for assessment and consultation to pulmonologists for diagnostic tests and admission as required. If the symptoms are solely due to cancer particularly oral and neck cancer without any suspicion of COVID-19 co-infection, the patient might be permitted to proceed with the hospital care [12].

Patients who are confirmed COVID positive during perioperative care should follow isolation and quarantine procedures. Immediate tracing, testing, screening, isolating, and monitoring of the involved surgery teams including surgeons, anesthesiologists, and nurses are required. Home isolation for two weeks should involve daily

monitoring for cough, rhinorrhea, dyspnea, myalgia, and twice-daily temperature measurements. Nasopharyngeal swabs need to be performed on day 1–5 and day 14 after exposure. However, this scenario will bring additional pressures due to the hospital shortage of manpower that should be anticipated.

2.1.4. Health system

Performing cancer surgery and care maintenance is not without risks to the health system. The latest trajectory of COVID-19 transmission in developing countries shows a rapid surge of new cases and mortality rates [4,5]. It is also predicted that the cases will continue increasing in the next few months. Shortages of PPE, ventilator, and ICU beds, conversion operation theatre into ICU, and construction of temporary hospitals have been reported in Italy, Spain, and Iran [25]. Therefore, maintaining the service of cancer surgery will significantly compete with hospital resources to fight against the pandemic.

2.1.5. Temperature monitoring for hospital workers

The body temperature of staff in the cancer surgery department and the whole hospital personals need to be monitored twice a day and reported electronically [14] to facilitate intelligible and accessible monitoring. Medical leave for any reason also needs to be documented. The clinical coordinator should evaluate the temperature monitoring, medical leave, and surveillance of any cluster (3 or more staff members) who develop fever or medical leave for respiratory complaints to receive further follow-up [14].

2.2. Pre-operative planning for cancer surgery during COVID-19 pandemic

Each cancer surgery department has to set conditional protocol for preoperative cancer surgery care. There is also a growing need for training of health care workers in the operating theatre, ICU, and outpatient clinics for COVID-19 infection control and containment management [26]. Preoperative assessment for anesthesia in cancer surgery should consider particular intubation techniques with rapid sequence procedure and local intratracheal management to minimize postoperative coughing and aerosol or droplet production [27]. Sufficient training in the implementation of suitable PPE as well as donning and doffing should be given to healthcare workers in perioperative care [27]. Surgical oncologists also have to develop pandemic emergency procedures including preparation and anticipation of shortages in PPE, blood supply, and medical treatment.

Although triage has been performed for all hospital visitors, preoperative patients need additional multilevel screening and testing for potential COVID-19 infection [14]. Since overlapping symptoms might exist between intrinsic cancer with COVID-19 infection, careful assessment should be given to patients with head and neck cancer, undergoing radiotherapy, the elderly, and those with lung metastasis [28]. Slightly elevated body temperature, cough, running nose, and sore throat could be found in patients with lung metastasis or receiving radiotherapy in the neck and chest [28]. Positive results during screening should be followed by referral for subsequent testing [14]. For COVID-19 confirmed positive patients, immediate transfer to quarantine ward is compulsory and the planned cancer surgery should be deferred until the patients fully recover. Procedures involving contact tracing, isolation, and testing including in the hospital contact should be followed.

2.3. Performing cancer surgery

The most important step in the decision for cancer surgery is prioritizing patients who require essential surgery [29] after careful discussion in the multidisciplinary cancer team. To assist prioritization, we classified cancer cases frequently diagnosed in cancer surgery into urgent, less urgent, and least urgent according to the need for surgery as shown in Table 1. Urgent surgery should proceed into surgery immediately, less urgent can be delayed up to 1 month, and least urgent can be delayed up to 3 months. Certain types of breast cancer and the majority of HNSCC are included in urgent surgery to establish diagnosis followed by chemotherapy and or/with radiotherapy as a strategy to form a bridge before performing surgery. High-risk thyroid cancers and high-grade sarcomas also need urgent surgery because of their aggressive behavior and limited options for other therapy. Less urgent surgery could be considered for well-differentiated thyroid cancer without metastasis, low-grade sarcoma, and low-grade salivary cancers because there is strong evidence that delayed diagnosis and treatment might still result in relatively excellent outcomes [30,31]. Benign thyroid lesions and in situ ductal breast carcinoma can be considered as the least urgent surgery. The process for case prioritization should include department staff and tumor board for cases that might be allocated for other treatment options such as radiotherapy or chemotherapy [29]. When planning surgery procedures that generate aerosol, the American College of Surgeons recommends preoperative COVID-19 testing. However, PCR-based testing is not always widely available in developing countries. Local hospital policy should regulate the indication for testing after careful assessment from pulmonologists and how to triage patients with positive or negative results. For cancer surgery procedures involving prolonged AGP and exposing upper aerodigestive tracts, N95 plus droplet PPE (gown, gloves, eye protection) are recommended as minimum protection for all staff members within operation theatre [15].

2.4. Post-operative care for cancer surgery during COVID-19 pandemic

Particular postoperative protocols for cancer surgery have to be ratified in response to the COVID-19 outbreak. For surgery involving upper aerodigestive tracts and AGPs including tracheostomy, frequent airway suction, high-frequency oscillatory ventilation, positive pressure ventilation, prolong endotracheal intubation, chest physiotherapy, nebulizer treatment, bronchoscopy, and sputum induction; postoperative care should be provided in separate units [12]. Trained healthcare workers should be considered a priority to attend cancer surgery patients with appropriate PPE usage and a separated postoperative room with appropriate ventilation system for procedures involving prolonged AGPs and exposing aerodigestive mucosa should be considered [26].

3. Engagement with hospital policy during COVID-19 pandemic

3.1. Education for patients and staffs

Information and educational resources including appropriate PPE, personal hand hygiene, and social distancing, and should be placed both online in the hospital webpage and in outpatient clinics, inpatient unit, nurse station, patient waiting rooms, surgery preparation rooms to serve as a remainder for healthcare workers and as patients' reliable source of information.

3.2. An adequate supply of PPE

Although not directly treating patients with COVID-19, cancer surgeons who maintain service during pandemic have to ensure sufficient supplies of PPEs and medicines for all workers related to cancer treatment. Proper planning and regular checks have to be implemented on a weekly basis for medical supplies including masks, gowns, goggles, gloves, and medicines used for cancer surgery and treatment.

3.3. Telemedicine and virtual coordination

There is a growing need for telemedicine as an alternative during the pandemic. Patients can register and reserve for telemedicine consultation with surgeons as replacement of outpatient visits. Although

implementation in developing countries is challenging because of unequal access to the internet among cancer patients, reimbursement to insurance, prescription and providing medicine, documentation into the medical record, and wound care after surgery. However, negotiations with insurance companies and hospital authorities at local and national levels might be able to close this gap. Video conference meetings for coordination among healthcare workers should be considered to minimize direct face-to-face meetings. Virtual coordination is particularly important in deciding treatment for each patient by involving a multidisciplinary team of tumor boards. Allocation and capability from radiation oncology and medical oncology should be regularly discussed to ensure that patients will receive initial and adequate treatment without diminishing their overall survival and quality of life.

3.4. Management of human resources

Provision and policies for human resource allocation for maintenance of cancer surgery service are very important to ensure the continuity of care. Clinical coordinators in the surgical oncology department should plan for available manpower for the high risk of quarantine or medical leave due to a higher probability to encounter COVID positive individuals. Because the rates of infections in the community are not exactly estimated in developing countries, the threat of COVID-19 transmission is likely to come from community interaction rather than nosocomial sources [5,14]. Social distancing after work hours has to be implemented for all staff to avoid community-acquired infections including cancellation of regional, national, and international meetings or conferences.

4. Meeting the resource scarcity with ethical issues

Triage, prioritization, and postponing cancer surgery during the COVID-19 pandemic will raise ethical concerns regarding the inherent merit and dignity of each cancer patient to receive the best treatment even in the presence of limited resources [32]. Therefore, all decisions should be made according to the ultimate aim to maximize health benefits for all patients independently from unjustified discrimination and nepotism. All shared decisions and recommendations should be documented and listed to ensure that the patients will receive surgery and treatment according to the schedule after postponing. Facilitating the affected patients should be done to ease the referral system and to improve treatment adherence. Cancer surgeons need to work together with other oncologists to communicate decisions and to provide other alternatives or possible treatment. Compassionate communication should be built with patients and their family members to collectively inform about the disease, the decision according to the current pandemic situation, and the value of treatment goals to engage them with the treatment plan and to improve adherence [33].

5. Conclusion

The current surge of COVID-19 infection worldwide has affected the health system even harder in the developing countries where resources are already limited. During the COVID-19 crisis, triage and prioritization of cancer surgery are aimed to preserve patient's functioning, long-term prognosis, and quality of life. The focus of current cancer surgery care has shifted into the establishment of definitive diagnosis, staging, and selected essential surgery. With the particular burdens and challenges in LMICs, cancer surgeons need to act proportionally to support the health systems in maintaining service for essential cancer surgeries while protecting patients and healthcare personnel from COVID-19 transmission and conserving the valuable amid limited hospital resources. Active communication and coordination with other departments in a multidisciplinary team are required to ensure that the patients will receive timely, effective, and the best available options for their cancer treatments during the pandemic.

Declaration of competing interest

All authors have declared that they have no potential conflicting interests.

Abbreviations

AGP	aerosol-generating procedure
CDC	center for disease control
COVID-19	coronavirus disease – 2019
ICU	intensive care unit
HNSCC	head and neck squamous cell carcinoma
LMIC	low and middle-income country
N95	respirator that blocks ≥95% of very small (0.3 μm) test particles
PAPR	powered air-purifying respirator
PPE	personal protective equipment
SARS	systemic acute respiratory syndrome
WHO	world health organization

Ethical approval

Not applicable.

Sources of funding

SLA received Dana Masyarakat (1499/2019 and 2020) and RTA (133/2607-2020) grants from UGM and Tahir Foundation seed grant (1/2018 and 1/2020).

Author contribution

SLA conceptualized and wrote the first draft. WAH and TA provided supervision, data curation, and validation. All authors read, reviewed, and approved the final draft.

Registration of research study

Not applicable

Guarantor

SLA.

Provenance and peer review

Not commissioned, externally peer-reviewed.

References

[1] C. Sohrabi, Z. Alsafi, N. O'Neill, M. Khan, A. Kerwan, A. Al-Jabir, C. Iosifidis, R. Agha, World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19), Int. J. Surg. (2020), https://doi.org/10.1016/j.ijsu.2020.02.034.

[2] J. Bedford, D. Enria, J. Giesecke, D.L. Heymann, C. Ihekweazu, G. Kobinger, H.C. Lane, Z. Memish, M. don Oh, A.A. Sall, A. Schuchat, K. Ungchusak, L.H. Wieler, COVID-19: towards controlling of a pandemic, Lancet (2020), https://doi.org/10.1016/S0140-6736(20)30673-5.

[3] World Health Organization (WHO), Strategic preparedness and response plan: country preparedness and response status for COVID-19, https://www.who.int/publications-detail/strategic-preparedness-and-response-plan-for-the-new-coronavirus, (2020) 19-21.

[4] R. Djalante, J. Lassa, D. Setiamarga, C. Mahfud, A. Sudjatma, M. Indrawan, B. Haryanto, M.S. Sinapoy, I. Rafliana, S. Djalante, L.A. Gunawan, R. Anindito, H. Warsilah, I.G.A. Surtiari, Review and analysis of current responses to COVID-19 in Indonesia: period of january to march 2020, Prog. Disaster Sci. 6 (2020) 100091, https://doi.org/10.1016/j.pdisas.2020.100091.

[5] M. Martinez-Alvarez, A. Jarde, E. Usuf, H. Brotherton, M. Bittaye, A.L. Samateh, M. Antonio, J. Vives-Tomas, U. D'Alessandro, A. Roca, COVID-19 pandemic in west Africa, Lancet Glob. Heal. (2020), https://doi.org/10.1016/s2214-109x(20)

30123-6.
[6] WHO, Strengthening the health system response to COVID-19 Recommendations for the WHO European Region Policy brief, https://www.thelancet.com/journals/langlo/article/PIIS2214-109X, (2020) 8.
[7] R. Sullivan, O.I. Alatise, B.O. Anderson, R. Audisio, P. Autier, A. Aggarwal, C. Balch, M.F. Brennan, A. Dare, A. D'Cruz, A.M.M. Eggermont, K. Fleming, S.M. Gueye, L. Hagander, C.A. Herrera, H. Holmer, A.M. Ilbawi, A. Jarnheimer, J. fu Ji, T.P. Kingham, J. Liberman, A.J.M. Leather, J.G. Meara, S. Mukhopadhyay, S.S. Murthy, S. Omar, G.P. Parham, C.S. Pramesh, R. Riviello, D. Rodin, L. Santini, S.V. Shrikhande, M. Shrime, R. Thomas, A.T. Tsunoda, C. van de Velde, U. Veronesi, D.K. Vijaykumar, D. Watters, S. Wang, Y.L. Wu, M. Zeiton, A. Purushotham, Global cancer surgery: delivering safe, affordable, and timely cancer surgery, Lancet Oncol. (2015), https://doi.org/10.1016/S1470-2045(15)00223-5.
[8] S.L. Anwar, G. Tampubolon, M. Van Hemelrijck, S.H. Hutajulu, J. Watkins, W. Wulaningsih, Determinants of cancer screening awareness and participation among Indonesian women, BMC Canc. 18 (2018), https://doi.org/10.1186/s12885-018-4125-z.
[9] S.L. Anwar, G. Adistyawan, W. Wulaningsih, C. Gutenbrunner, B. Nugraha, Rehabilitation for cancer survivors: how we can reduce the healthcare service inequality in low- and middle income countries, Am. J. Phys. Med. Rehabil. (2018) 1, https://doi.org/10.1097/PHM.0000000000000982.
[10] R.J. Bleicher, K. Ruth, E.R. Sigurdson, J.R. Beck, E. Ross, Y.N. Wong, S.A. Patel, M. Boraas, E.I. Chang, N.S. Topham, B.L. Egleston, Time to surgery and breast cancer survival in the United States, JAMA Oncol. (2016), https://doi.org/10.1001/jamaoncol.2015.4508.
[11] L. Zhang, F. Zhu, L. Xie, C. Wang, J. Wang, R. Chen, P. Jia, H.Q. Guan, L. Peng, Y. Chen, P. Peng, P. Zhang, Q. Chu, Q. Shen, Y. Wang, S.Y. Xu, J.P. Zhao, M. Zhou, Clinical characteristics of COVID-19-infected cancer patients: a retrospective case study in three hospitals within Wuhan, China, Ann. Oncol. (2020), https://doi.org/10.1016/j.annonc.2020.03.296.
[12] A.T. Day, D.J. Sher, R.C. Lee, J.M. Truelson, L.L. Myers, B.D. Sumer, L. Stankova, B.N. Tillman, R.S. Hughes, S.A. Khan, E.A. Gordin, Head and neck oncology during the COVID-19 pandemic: reconsidering traditional treatment paradigms in light of new surgical and other multilevel risks, Oral Oncol. (2020), https://doi.org/10.1016/j.oraloncology.2020.104684.
[13] J.J. Biagi, M.J. Raphael, W.J. Mackillop, W. Kong, W.D. King, C.M. Booth, Association between time to initiation of adjuvant chemotherapy and survival in colorectal cancer a systematic review and meta-analysis, JAMA, J. Am. Med. Assoc. (2011), https://doi.org/10.1001/jama.2011.749.
[14] W. Hoe Gan, J. Wah Lim, D. Koh, Preventing intra-hospital infection and transmission of COVID-19 in healthcare workers, Saf. Health Work. (2020), https://doi.org/10.1016/j.shaw.2020.03.001.
[15] J.D. Forrester, A.K. Nassar, P.M. Maggio, M.T. Hawn, Precautions for operating room team members during the COVID-19 pandemic, J. Am. Coll. Surg. (2020), https://doi.org/10.1016/j.jamcollsurg.2020.03.030.
[16] S.O. Cheng, S. Khan, Personal protective equipment in the response to the SARS-CoV-2 outbreak, Int. J. Surg. 78 (2020) 3–4, https://doi.org/10.1016/j.ijsu.2020.04.011.
[17] European Centre for Disease Prevention and Control, Infection Prevention and Control for COVID-19 in Healthcare Settings, Elsevier's Nov, Coronavirus Inf. Cent., 2020, https://www.ecdc.europa.eu/en/publications-data/infection-prevention-and-control-and-preparedness-covid-19-healthcare-settings.
[18] A. Yassi, D. Moore, J.M. Fitzgerald, P. Bigelow, C.Y. Hon, E. Bryce, Research gaps in protecting healthcare workers from SARS and other respiratory pathogens: an interdisciplinary, multi-stakeholder, evidence-based approach, J. Occup. Environ. Med. (2005), https://doi.org/10.1097/01.jom.0000150207.18085.41.
[19] M. Her, Repurposing and reshaping of hospitals during the COVID-19 outbreak in South Korea, One Heal 5 (2020) 100137 0.1016/j.onehlt.2020.100137.
[20] Z. Wu, J.M. McGoogan, Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China, J. Am. Med. Assoc. (2020), https://doi.org/10.1001/jama.2020.2648.
[21] C.M. Booth, L.M. Matukas, G.A. Tomlinson, A.R. Rachlis, D.B. Rose, H.A. Dwosh, S.L. Walmsley, T. Mazzulli, M. Avendano, P. Derkach, I.E. Ephtimios, I. Kitai, B.D. Mederski, S.B. Shadowitz, W.L. Gold, L.A. Hawryluck, E. Rea, J.S. Chenkin, D.W. Cescon, S.M. Poutanen, A.S. Detsky, Clinical features and short-term outcomes of 144 patients with SARS in the greater toronto area, J. Am. Med. Assoc. (2003), https://doi.org/10.1001/jama.289.21.JOC30885.
[22] A. Heinzerling, M.J. Stuckey, T. Scheuer, K. Xu, K.M. Perkins, H. Resseger, S. Magill, J.R. Verani, S. Jain, M. Acosta, E. Epson, Transmission of COVID-19 to health care personnel during exposures to a hospitalized patient - solano county, California, february 2020, MMWR Morb. Mortal. Wkly. Rep. (2020), https://doi.org/10.15585/mmwr.mm6915e5.
[23] W. Liang, W. Guan, R. Chen, W. Wang, J. Li, K. Xu, C. Li, Q. Ai, W. Lu, H. Liang, S. Li, J. He, Cancer patients in SARS-CoV-2 infection: a nationwide analysis in China, Lancet Oncol. (2020), https://doi.org/10.1016/S1470-2045(20)30096-6.
[24] E. Livingston, K. Bucher, Coronavirus disease 2019 (COVID-19) in Italy, J. Am. Med. Assoc. (2020), https://doi.org/10.1001/jama.2020.4344.
[25] P.C. Yuri Bruinen de Bruin, Anne-Sophie Lequarre, Josephine McCourt, Initial impacts of gloval risk mitigation measures taken during combatting the COVID-19 pandemic, Saf. Sci. (2020) e104773.
[26] S. Huh, How to train the health personnel for protecting themselves from novel coronavirus (COVID-19) infection during their patient or suspected case care, J. Educ. Eval. Health Prof. (2020), https://doi.org/10.3352/jeehp.2020.17.10.
[27] X. Wen, Y. Li, Anesthesia procedure of emergency operation for patients with suspected or confirmed COVID-19, Surg. Infect. (2020), https://doi.org/10.1089/sur.2020.040.
[28] B.A.C. Jeremy Tey, Shaun Ho, Navigating the challenges of the COVID-19 outbreak: perspectives from the radiation oncology service in Singapore, Radiother. Oncol. (2020).
[29] D.L. Bartlett, J.R. Howe, G. Chang, A. Crago, M. Hogg, G. Karakousis, E. Levine, A. Maker, E. Mamounas, K. McGuire, N. Merchant, D. Shibata, V. Sohn, C. Solorzano, K. Turaga, R. White, A. Yang, S. Yoon, Management of cancer surgery cases during the COVID-19 pandemic: considerations, Ann. Surg Oncol. (2020) 1–4, https://doi.org/10.1245/s10434-020-08461-2.
[30] M.J. Jeon, W.G. Kim, H. Kwon, M. Kim, S. Park, H.S. Oh, M. Han, T.Y. Sung, K.W. Chung, S.J. Hong, T.Y. Kim, Y.K. Shong, W.B. Kim, Clinical outcomes after delayed thyroid surgery in patients with papillary thyroid microcarcinoma, Eur. J. Endocrinol. (2017), https://doi.org/10.1530/EJE-17-0160.
[31] E. Morse, R.J.T. Fujiwara, B. Judson, S. Mehra, Treatment Times in Salivary Gland Cancer: National Patterns and Association with Survival, Otolaryngol. - Head Neck Surg. (United States), 2018, https://doi.org/10.1177/0194599818758020.
[32] S. Zarrintan, Surgical operations during the COVID-19 outbreak: should elective surgeries be suspended? Int. J. Surg. (2020), https://doi.org/10.1016/j.ijsu.2020.04.005.
[33] J.M. Marron, S. Joffe, R. Jagsi, R.A. Spence, F.J. Hlubocky, Ethics and resource scarcity: ASCO recommendations for the oncology community during the COVID-19 pandemic, J. Clin. Oncol. (2020), https://doi.org/10.1200/JCO.20.00960.
[34] D.J. Thomson, D. Palma, M. Guckenberger, P. Balermpas, J.J. Beitler, P. Blanchard, W. Budach, J. Caudell, J. Corry, R. Corvo, Practice recommendations for risk-adapted head and neck cancer radiotherapy during the COVID-19 pandemic: an ASTRO-ESTRO consensus statement, Int. J. Radiat. Oncol. Biol. Phys. (2020) 31034–31038, https://doi.org/10.1016/j.ijrobp.2020.04.016.

Perspectives on how to navigate cancer surgery in the breast, head and neck, skin, and soft tissue tumor in limited-resource countries during COVID-19 pandemic

ORIGINALITY REPORT

12%	7%	10%	4%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

MATCH ALL SOURCES (ONLY SELECTED SOURCE PRINTED)

2%

★ Sumadi Lukman Anwar, Ery Kus Dwianingsih, Widya Surya Avanti, Lina Choridah, Suwardjo, Teguh Aryandono. "Aggressive behavior of Her-2 positive colloid breast carcinoma: A case report in a metastatic breast cancer", Annals of Medicine and Surgery, 2020

Publication

Exclude quotes	On	Exclude matches	Off
Exclude bibliography	On		