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**A RETROSPECTIVE ANALYSIS OF PALLIATIVE SURGICAL PROCEDURES FOR ADVANCED MALIGNANCIES IN A PRIVATE TERTIARY CANCER CARE CENTER.**

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**Abstract:** Palliative surgery is an important, yet understudied aspect of palliative care. The present article emphasizes the diversity of palliative surgical procedures performed at a private tertiary cancer care center in India and the need of the multidisciplinary approach towards it. Though the overall morbidity and mortality is high, a significant number of cancer patients are alleviated from their symptoms and have a better quality of life, even in those with an anticipated short survival.

**INTRODUCTION**

Cancer is one of the common causes of death in developing countries. Cancer care involves many forms of treatment intended for either cure or palliation; including chemotherapy, radio-therapy and surgical therapy. Curative therapy for cancer often revolves around well-characterized surgical principles and procedures. However, in the course of their disease, cancer patients often present with surgically unresectable disease or with a recurrent malignancy that requires palliative intervention/s that are less clearly defined. Likewise, the well established survival curve, appropriate for

describing the curative phase of cancer care, has modest value in palliation. Resolution of chief complaints, improved quality of life, pain control and procedure durability with minimal morbidity are the more pertinent therapeutic considerations in palliation.<sup>1-3</sup>

The importance of palliation of cancer symptoms has received increasing attention in the recent years. Surgeon's involvement in alleviating cancer symptoms has been longstanding, but reports on palliative surgery have suffered from both inconsistent definitions

of palliative surgery and a lack of prospective evaluation of patient symptoms.<sup>4</sup>

Surgeons have stated a preference for defining surgery as palliative on the basis of the patient’s preoperative clinical evaluation, disease stage, and presence of symptoms. In actual practice, however, surgeons more routinely define surgery as palliative on the basis of the presence of residual malignant disease at surgery completion or easing of major symptoms in inoperable or metastatic cancers.<sup>2-3</sup> A major pitfall in defining surgery palliative is the inclusion of cancer patients with residual disease who are without symptoms.

There are many case reports on various operative palliative procedures, but a petite review of the all the palliative procedures, diverse anatomical sub-site distributions and associated morbidity from a single institution.<sup>4-8</sup> One of the strengths of this article is that it directly reviews various palliative procedures performed in a single institution and the need for various inter-department interaction for better management of patients with advanced disease.

**Methods**

We retrospectively reviewed the computerized and programmed surgical data of

all patients with advanced cancers from January 2013 till January 2017 performed in the Department of Surgical Oncology, Indus Superspeciality Hospital, Mohali (INDIA), a non government tertiary cancer center. We defined major operations before surgery as curative or palliative by using a set definition of palliative surgery developed from results of a published surveys.<sup>6</sup> Implants used for par enteral nourishment (Hickmann and chemoport implants) and pain management (ganglion blocks) were also included. We further subdivided the palliative procedures based on the core anatomical areas. The type of palliative procedure was also defined for different core region cancers. Morbidity and mortality was thus calculated.

**Results**

Fifty three patients out of total two hundred and fifty-seven (53/257; 20.6%) underwent palliative surgical procedure/s in the Department of Surgical Oncology, which included 29 males (54.7%) and 24 females (45.3%). Age ranged from 22 to 82 years (mean 48.14 years). The palliative surgeries performed based on anatomical core area and types of procedure are shown in table 1 and 2 respectively.

**Table 1: Palliative procedures performed in various core areas.**

Regional core area	No of patients who underwent palliative surgery	Total number of patients under each core area undergoing surgery	Percentage of patients receiving palliative surgery
Breast cancer	9	64	14.06%
Colorectal cancer	10	32	31.25%
Gastroesophageal cancer	7	26	26.92%
Gynecology cancer	3	80	3.75%
Hepatobiliary cancer	9	22	40.90%
Head and neck cancer	14	29	48.27%
Soft tissue sarcoma	1	4	25%

**Table 2: Type of palliative procedure/s performed.**

Sr no	Type of Surgical Procedures	Number	Percentage
1	Feeding Procedures	8	15.09%
2	Bypass /Diversion Procedures	32	60.37%
3	Resection	13	24.52%
4	Pain management/ Blocks	4	7.54%
<b>Total</b>		53	

Table 3 shows the palliative surgeries performed as per the region. Majority of the palliative procedures (32.06%) performed were for gastrointestinal system. Patients with gastrointestinal and hepatobiliary cancer received palliative treatment in 58.17% and 40.7% respectively. Most common palliative procedure was diversion/ bypass like colostomy or gastrojejunostomy in 60.37% patients.

Intraoperative complication was seen in 6 patients (arrhythmias in three, ileal injury in two and bladder injury in one patient). However, there was no intra-operative mortality. Mean duration of hospitalization was 13.40 days. Data revealed overall morbidity in 24 patients (45.28%) and 7 deaths (13.2%). Table 4 shows the morbidity pattern and within 30 days mortality statistics observed in the patients who underwent palliative surgical treatment.

**Table 3: Type of palliative procedure performed in metastatic region wise distribution.**

Core area distribution	Type of palliative procedure	No of patients	Total no of procedures	Percentage of procedures
Gastro-esophageal Cancers	Feeding Procedures	1	7	13.20%
	Diversion	5		
	Resection	1		
Hepato-pancreatico-biliary Cancers	Feeding Procedures	2	13	24.52%
	Diversion	7		
	Pain block	4		
Colorectal Cancers	Diversion	9	10	18.86%
	Resection	1		
Genitourinary Cancers	Diversion	2	3	5.66%
	Resection	1		
Breast Cancers	Resection (Palliative mastectomy)	9	9	16.98%
Limb Soft tissue sarcoma	Resection (Amputation )	1	1	1.88%
Head and neck	Feeding Procedures	5	9	16.98%
	Diversion (Airway-Tracheostomy)	4		

**Table 4: Type of morbidity and within 30 days mortality pattern**

Event	Cause	Number	Total
Morbidity	Wound infection	18	24
	Gastroparesis	2	
	Bleeding	1	
	Intestinal obstruction	1	
	Seroma	1	
	Wound dehiscence	1	
Mortality	Septicemia	5	07
	Pulmonary embolism	1	
	Tumor related bleeding	1	

### Discussion

The present study places the highest value on preserving and maximizing the quality of life (QOL) even in a diagnosed terminal cancer patient. Both, the terminal ill patient and his/her family, eventually accept the illness after having passed through the stages of bereavement. They are faced with difficult decisions of holding on to hope for a cure and continuing aggressive treatment versus palliative care.

According to World Health Organization (WHO), palliative care is defined as the active total care of patient whose disease is not responsive to curative treatment.<sup>6</sup> The term palliative care is often used interchangeably with hospice care, and its goal is to ensure that the patient and family achieve the best possible QOL. Palliative care is directed towards alleviating the symptoms and suffering, thereby improving QOL, whether or not treatment is being directed at modifying the underlying disease or prolonging life.

The Indian subcontinent, that shelters about one-sixth of world's population, has a huge burden of suffering from life-limited diseases.<sup>9</sup> At present, it is roughly estimated that approximately 1 million new cancer cases per annum will be recorded and at any given time

there will be 3 million cancer patients in India. Less than 1% of its population has access to palliative care. Cultural attitudes, low socio-economic status, low literacy rates and lack of good referral centers ensure that most patients are diagnosed at an advanced and sometimes, terminal stage of the disease. It is very hard for these patients to achieve a definitive cure and majority is treated by palliative care at a higher cost and morbidity.<sup>9</sup>

Measures to improve palliative care tend to focus on a form of care that until now is offered mainly in selected institutional settings like tertiary referral centers, specialized hospital units or hospices. A major challenge to implement palliative care is in the limited evidence for this specialty. Majority of the articles pertaining to palliative care is on the pain management. Reviews on the surgical aspect in palliative management are not many.<sup>10</sup> Purpose of the present article is to review the various palliative surgical procedures offered at a tertiary cancer care center like our and the need for inter-departmental coordination for the better care of the advanced disease patient.

Palliative surgery is an imperative part of the comprehensive multidisciplinary oncologic care at cancer centers; however, its scope, variety

of procedures, and cost has not been well documented. In fact, the surgical oncology literature rarely focuses on QOL issues, and primarily relies on end points of morbidity and mortality. Among the multidisciplinary cancer management approaches (radiotherapy, chemotherapy, rehabilitation, pain service consultation, etc), surgery is the least discussed about.<sup>11-12</sup>

Case reports, retrospective studies, and prospective randomized trials have evaluated a variety of outcomes for numerous types of cancer treated with palliative surgery. Consideration for palliative intervention includes safety, efficacy, patient comfort, resolution of symptom/s, length of hospital, survival, postoperative complications and recurrence of symptoms.<sup>13-14</sup> For a patient with advanced cancer, the primary focus of the surgeon should be symptom relief rather than reversing the malignant process itself.<sup>15</sup>

Diversity of surgical procedures is available to manage symptoms in cancer patients extending the spectrum of invasiveness, from per cutaneous interventions under radiologic guidance to open surgeries. Alternative non-invasiveness options available are chemotherapy and radiotherapy.<sup>16</sup> Decisions regarding use of surgical procedures for palliation of symptom/s caused by advanced malignancies require the highest level of surgical judgment. Regardless of the anatomic sites, decision over surgical palliation must consider medical prognosis of the cancer, availability of nonsurgical treatments and the patient's anticipated QOL.

The forefront movements towards palliative care have been centered on four areas: obstruction, nutrition, bleeding and pain. At times, these must be performed on an emergency basis. Bypass or Diversion is the most common palliative procedures done in patients with obstruction of hollow viscera, such as large or

small bowel, stomach, esophagus, bile ducts, or the urinary system.<sup>17-18</sup>

At times, tumors may need to be resected for bleeding (stomach, colon, breast etc) or prevention of local complications (breast). Nutritional care in patients with inoperable head and neck cancers, esophageal and gastric cancers who cannot feed normally is achieved by doing feeding gastrostomy or jejunostomy. Pain control in patients with nerve root impingement, head and neck tumors, chest wall invasion is management using intrathecal implants or nerve stimulator. In addition, procedures to relieve fluid accumulation in pleural, pericardial, and peritoneal sac can be done in patients with impaired respiratory function, difficulty in eating and discomfort.<sup>17-18</sup>

This retrospective review demonstrates that palliative surgical procedures are an integral part of end-of-life care of a cancer patient, counting for about one-fifth of the surgical cases done in our institute. Majority of the cases referred for palliative surgeries are of the pancreatico-biliary and gastrointestinal malignancies, constituting 49.05% patients in this series. Moreover it is seen that gastro-esophageal and colorectal malignancies require some sort of palliation in 26.92% and 31.25% cases respectively.

Patients may be incapable to feed normally, owing to mechanical obstruction or radiotherapy/chemotherapy induced severe mucositis. Such patients may be in a malnourished state that compromises their chances of successful recovery. Feeding procedures are categorized as enteral or, parenteral if the enteric conduit cannot be placed. Nasogastric tube has been the standard method of postoperative alimentation in head and neck cancer patients. However prolonged use of a nasogastric tube is cumbersome and associated with many problems (tube impaction, obstruction

and mal-placement). Hence feeding gastrostomy or jejunostomy is good alternative conduit for feeding. Home total par-enteral nutrition (TPN) is relatively complex and expensive alternative. TPN is not routinely indicated in the management of cancer related anorexia or cachexia. However in few cases where enteral route is unavailable, home TPN either through chemoport or Hickmann catheters can be commonly used.

Malignant bowel obstruction (MBO) is a challenging complication of advanced cancer. Several patho-physiologic mechanisms are responsible for the syndrome, including mechanical compression by the advanced tumor, motility disorders, gastrointestinal secretion accumulation, decreased gastrointestinal absorption, and inflammation. The treatment of related symptoms requires a multidisciplinary approach of surgical, interventional, and medical specialists. Surgical approach proves beneficial in selected patients with life expectancy greater than 2 months, and good performance status. Watt et al in a systemic review of the published articles emphasized on self expanding metallic stents (SEMS) as a safe and effective method in overcoming left-sided malignant colorectal obstructions.<sup>19</sup> Dilemmas still persist on the invasiveness of a surgical procedure due to unclear clinical equipoise when comparing a surgical approach with nonsurgical procedures. However due to higher cost of stents, *ostomies* are good alternative palliative procedure offered to obstructed, unresectable colorectal and gynecological cancers. The diversion or palliative bypass procedures (3/5<sup>th</sup> of the cases in the present series) is often rationalized because of the uncertainty of performing a major resection in patients with clearly advanced stage at laparotomy, or in an emergent setting particularly when the patient has a less chance of long-term survival.

In locally advanced stomach carcinoma, gastro-jejunostomy is a good palliative procedure to relieve the obstruction. Satoshi et al in a review of metastatic gastric cancer with gastric outlet obstruction reported that 25 patients underwent palliative procedure (13 gastrectomy, 12 gastroenteric anastomosis) and resultant morbidity of 47.1% with a slight better survival.<sup>20</sup> In a recent review of all gastrectomies performed at Memorial Sloan-Kettering Cancer Center for gastric adenocarcinoma, 307 of 1595 patients (79%) received a non-curative gastric resection.<sup>21</sup> The intent of the operation was palliative in 48% (147/307). An operation was considered palliative only when the record explicitly stated that it was performed to relieve specific symptoms, control pain, or improve quality of life. The authors reported high peri-operative morbidity and mortality rates in patients who underwent total gastrectomy, thereby raising concerns with the procedure. This conclusion is supported by Remine in 1979, who also suggested that total gastrectomy was not a satisfactory palliative operation.<sup>22</sup> Few series showed improved symptom relief with gastrectomy compared to gastroenterostomy with less morbidity.<sup>23</sup> Others have based their support primarily on improved survival data, thereby proposing that resection should be performed whenever technically feasible.<sup>24</sup> The present series reports a favor towards bypass than resection in view of the locally advanced gastric cancers and poor performance status in our patients.

Palliative treatment of unresectable periampullary cancer patients is directed at three major symptoms: obstructive jaundice, duodenal obstruction, and cancer-related pain. Surgical palliation of obstructive jaundice is indicated in patients with pancreatic or biliary malignancies that are deemed unresectable at the time of exploratory laparotomy or for patients in

relatively good medical condition with expected survival beyond 3 to 6 months.<sup>25</sup> Majority of the patients with unresectable periampullary cancer or distal cholangiocarcinoma require surgical biliary bypass especially in those whose endoscopic or percutaneous decompression failed. When pancreatic cancer is determined to be unresectable at the time of exploratory laparotomy or laparoscopy, prophylactic gastrojejunostomy should be performed in most cases, unless a life expectancy of less than 3 to 6 months is anticipated based on intraoperative findings.<sup>25</sup> Although routine gastrojejunostomy adds to operative time, it does not increase postoperative morbidity, mortality or length of hospital stay. In large retrospective studies of patients who did not undergo prophylactic gastrojejunostomy as part of a surgical procedure, between 10% and 25% of them developed obstructive symptoms requiring subsequent operative gastrojejunostomy, and an additional 20% eventually died with duodenal obstruction.<sup>22,26-29</sup> At our centre we routinely do palliative bypass when we access that patient may survive for more than six months.

Palliative breast surgery requires an experienced team accustomed to deal with all aspects of the patient's needs. Pain relief, alleviation of bleeding and odor, infringement on neurovascular structures, and the psychosocial issues of the patient and her family are the common factors dealt by the team. Often, locally advanced disease is associated with social stigma and a disruption of the normal family life. The disfigurement and hygienic problem often result in estrangement and shame. Bleeding, odor, and profound body image changes generally preclude normal sexual relationships. One of the goals of this palliative treatment is restoration of as normal existence as possible for these women who are often in the end phases of their lives. In an institutional database of 12,529 metastatic

breast carcinoma reviewed by Morrogh M et al, only 2% required local surgery (33% mastectomy, 52% WLE).<sup>30</sup> In his series 50% required surgery to optimize local control. At a median follow-up of 33.9 months, 53% patients remained alive and 88% were free of local disease.<sup>30</sup> Khan et al, on the basis of retrospective review of the National Cancer Database, reported that surgical resection in patients with metastatic breast cancer afforded patients a survival benefit.<sup>31</sup> Axillary node dissection carries the risk of lymphedema, motor nerve injury, and sensory loss from disruption of intercostal brachial nerves and however it did not appear to affect survival.<sup>32</sup> Thereby palliative mastectomy is by means to palliate breast or chest symptoms or pain in order to allow patients to resume active lifestyle with the fewest possible adverse effects.

Major amputation as palliation is not common at present. Various studies demonstrate palliative amputations hold the potential for restoring the ambulatory status of a bed-ridden patient because of extremity pain and dysfunction.<sup>33</sup> Ortiz et al performed inter-scapulothoracic disarticulation in 57 patients with palliative intent. Clinical situation was characterized by tumor (100%), pain (46%), functional incapacity (39%), ulceration (32%), and bleeding (9%).<sup>34</sup> In a review by Merismky et al, functional mobility after palliative lower extremity amputations was successfully restored in 75% of patients of lower limb sarcoma.<sup>33</sup> Although amputations are viewed at times as offering little to already compromised patients, they can improve dramatically the QOL in selected patients with intractable pain and functional compromise.

Interventional pain therapies are a part of the oncology interdisciplinary plan and should be instituted early in the management. Better pain relief and symptom control improves patient's

well being and QOL. Discovery of opioids receptors in the spinal cord led to the rationale for the use of intrathecal morphine for pain relief.<sup>35</sup> With the development of implantable, programmable, continuous drug delivery systems in the 1980s, the use of intraspinal opioids was greatly extended to cancer pain due to widespread metastasis. Other interventional procedures include neurolytic celiac plexus and superior hypogastric plexus block for refractory visceral pain.

Approximately 45% morbidity in our review is significantly more, compared to that reported by Krouse et al who reported morbidity of 25.9% and 10% in major and minor procedures, respectively. Average length of hospital stay was 12.4 days (range, 0-99 days) with 51 surgical procedures (21.3%) performed on an outpatient basis. A total of 20 patients (12.2%) died within 30 days of surgery, and 5 of these patients died within the first week.<sup>36</sup> Badgwell et al reported a 90-day morbidity and mortality rate of 40% and 7% respectively among the 119 patients who were offered palliative surgical treatment.<sup>37</sup> Miner in his prospective study of 1022 palliative procedures performed in 823 patients, reported a 30 day postoperative morbidity of 29% and mortality 11%. He reported a major postoperative complication reduced the probability of symptom improvement to 17%. Median survival in his review was adversely associated with poor performance status, poor nutrition or significant weight loss and no previous cancer therapy.<sup>38</sup> Present series revealed higher morbidity with majority being due to wound infection. This could be explained by the maximum number of our patients being referred to us after having received sub-optimum treatment at many places and also by the poor nutritional status of these patients.

There are many factors influencing a patient and his or her decision making regarding end-of-life care. Discussions with the patient and family should revolve around the aims of the surgical procedure, the potential benefits, the risks and complications, the improbability of the findings at the time of surgery, as well as the evolution of the disease in the absence of surgical intervention.

Patients may face the complications of palliative procedures without meeting the end goals. Thereby the influencing factors for decision making pertaining to palliative surgery should include the patient, the health care team, and the family. Other alternatives such as chemotherapy, radio-therapy, or a combination of these treatments are also considered as an alternative to palliative surgery. The intent of palliative care is to select the best treatment that maximizes QOL while minimizing risks and harm. To make such a choice, the overall goal of care must be identified. This goal often focuses on the relief of symptoms, improved QOL, possible increase in survival, and the ultimate goal of a peaceful death.

### **Conclusion**

The present review is a first step in the identification of different palliative procedures performed at a tertiary cancer center in India and the need of multidisciplinary approach towards it. Palliative care has focused predominantly on the use of palliative chemotherapy or radiotherapy rather than surgical interventions. The role of surgery in palliative care is multifaceted and not well characterized hence a broader comprehensive multidisciplinary oncologic care is required for the better care of advanced cancer patients. Surgical palliation can be performed in various ways for heterogeneous situations. With experience and time, wise application of palliative principles will not be a mystery to the surgeons. Moreover, alleviation of

sufferings and pain will be a standard concept in the discipline of palliative surgery. The present review on organ based various surgical palliative procedures elucidate the richness of the field and

the human elements of care that can be provided to these cancer patients. We hope, surgery holds the key role in palliative cancer care.

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