



Management of Peritoneal Surface Malignancies in Pakistan

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Abstract

This article looks at the current status and evolution of management of peritoneal surface malignancies in Pakistan. A brief overview of health-care infrastructure in the country and an outline of the centers actively involved in the management of PSM are provided.

Keywords Peritoneal Surface Malignancies · Cytoreductive Surgery · HIPEC

Peritoneal Surface Malignancies (PSM) are a heterogeneous group of pathologies that may be secondary to other malignancies or arise directly from the peritoneum. Over the last 2 decades, significant progress in the management of PSM has been made. With improvement in systemic therapies and aggressive locoregional treatments, the survival figures of patients with PSM have significantly improved from the initially reported median survival of a few months without treatment [1]. Cytoreductive surgery (CRS) and hyperthermic intraperitoneal chemotherapy (HIPEC) have become the standard of care for the management of malignant peritoneal mesothelioma and pseudomyxoma peritonei [2].

Many expert centers around the world have established CRS and HIPEC as an effective treatment in management armamentarium of PSM. Completeness of cytoreduction has been shown to improve the outcomes and give a patient the chance of cure [3, 4]. This aggressive treatment is however not without adverse effects, and major morbidity is reported in approximately 12–52% of patients [5]. The morbidity and mortality rates have been demonstrated to improve with the experience of the center [6]. CRS and HIPEC are therefore reported to have a learning curve of more than 50 cases [7–9].

There are many aspects of obtaining expertise in the management of PSM in addition to the operative skills of achieving complete cytoreduction. Developing a multidisciplinary team of individuals, judicious case selection, and appropriate

decision-making regarding the timing and appropriate modalities of treatment to be used are equally important [10]. It is also important to standardize the treatment process of patients with PSM to obtain improved outcomes. We have identified the need to develop dedicated centers in Pakistan to take the lead in the management of patients with PSM [11]. The role of such centers goes beyond patient treatment to collaboration with other centers, teaching/training of professionals involved in management of PSM as well as active engagement in research and maintenance of a comprehensive registry of all patients.

Health-Care Structure in the Country

The health-care delivery system in Pakistan is a combination of public and private sector providers. In the public sector, secondary health care is provided by Tehsil and District headquarter hospitals with support from teaching hospitals for tertiary care. In the private sector, tertiary care hospitals are mainly located in urban areas [12]. There have been many efforts for improvement in the health-care sector in Pakistan to reach the millennium development goals [13]. The health-care system of Pakistan faces many challenges like lack of governance and accessibility as well as shortage of resources among other significant problems [14]. High population growth rate and dual burden of communicable and non-communicable disease add to these challenges [12].

Cancer accounts for 7.6% of all deaths in the country [15]. Out of pocket health-care expenses are 54.9% [15], a figure that has improved from 75% almost a decade ago [12]. There

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is also lack of a robust mechanism to capture the health-care information of the population to ascertain true incidence/prevalence as well as outcomes for any cancer [15].

History of Peritoneal Surface Oncology in the Country

The uptake of aggressive locoregional therapy in the form of CRS and HIPEC in Pakistan has not been at the same pace as the developed world. There is no data to estimate the true incidence of peritoneal surface malignancies in Pakistan. However, all surgeons not so infrequently come across patients with peritoneal metastases as well primary peritoneal malignancies. The usual pattern of presentation is due to the symptomatology of advanced peritoneal disease, with little more than palliative care left to offer for these patients. The first CRS and HIPEC procedure in Pakistan was performed in 2008 (Pal KMI, personal communication). Over the last few years, there has been an initiative by some institutions to offer locoregional treatment strategies to patients with PSM. The key players have been surgeons in these centers taking the initiative to form a team of health-care professionals managing PSM.

Training Programs

Currently, there are no programs in Pakistan that offer training in the management of PSM. Most of the surgeons gained variable degree of exposure through attachments at an expert center. One of the authors is currently enrolled in the European School of Peritoneal Surface Oncology [16], which is a structured training program run by European Society of Surgical Oncology and Peritoneal Surface Oncology Group International [17].

Peritoneal Surface Malignancy Centers in the Country

There are four centers in the country that are performing CRS and HIPEC for management of patients with PSM. These are located in two major cities. Details of these centers with their caseload are provided in Table 1.

Referral Pattern

The main sources of referral to these centers are the treating medical/clinical oncologists. There are some patients who directly seek opinion regarding management of their disease. Since the decision-making and treatment of PSM are complex,

necessitating management in expert center, there is a need for effective referral mechanisms once these patients are identified.

Treatment Centers

The first center to start treatment of PSM with CRS and HIPEC was the Aga Khan University, Karachi that performed its first case in 2008. Since then, there have been a total of 13 cases performed. The distribution of cases was 6 pseudomyxoma peritonei, 4 colorectal cancer, and 3 ovarian cancer. There were no cytoreductive surgeries performed without HIPEC. These patients are discussed in the institutional general tumor board and management plan is decided.

Since 2015, the team at JPMC, a public sector hospital has been involved in management of patients with PSM. Since then, the team has received 22 referrals, and 14 CRS and HIPEC procedures have been performed. These included eight cases of pseudomyxoma peritonei and two cases each of peritoneal mesothelioma, colorectal cancer, and ovarian cancer. There were no cytoreductive surgeries performed without HIPEC.

At JPMC, the cases are individually evaluated by the surgeons, medical oncologist, pathologist, and radiologist. The team's surgeons as well as anesthesiologist have visited expert centers in order to gain exposure regarding perioperative management of patients undergoing CRS and HIPEC. The surgical plan is discussed with international experts for all patients selected for treatment.

Patel Hospital, Karachi, Pakistan, started taking part in the management of patients with PSM in 2016 shortly after establishment of a Surgical Oncology service. Interested clinicians from other institutions also joined hands to form a multidisciplinary team (MDT). This joint effort later transformed into a virtual MDT including an international expert. This Peritoneal MDT evaluates and discusses all patients referred to the service with PSM. The standardized evaluation pathway includes clinical evaluation, cross-sectional imaging, tumor markers, and staging laparoscopy.

Since 2016, the Peritoneal Malignancy Service at Patel Hospital has evaluated 72 patients with PSM and performed 11 CRS and HIPEC procedures. The discrepancy in the large number of cases referred and relatively smaller number of CRS and HIPEC procedures reflects the judicious case-selection criteria to identify cases that will benefit from aggressive locoregional treatment strategy. The distribution of CRS and HIPEC procedures is as follows: 1 patient, pseudomyxoma peritonei; 2 patients, appendiceal cancer; 3 patients, colorectal cancer; 3 patients, ovarian cancer; and 2 patients, malignant peritoneal mesothelioma. In addition, there have been five cases of cytoreductive surgery performed without HIPEC. These included one case of benign mesothelioma and four cases of ovarian cancer. The surgical

Table 1 Centers involved in management of PSM in Pakistan

S. no.	Center	Year started	Cases referred	Case selection/ decision-making	CRS/HIPEC performed	Indications
1	AKU, Karachi	2008	Not available	General tumor board discussion	13	PMP, 6 CPM, 4 OV, 3
2	JPMC, Karachi	2015	22	Individual review by professionals	14	PMP, 8 CPM, 2 OV, 2 PM, 2
3	PH, Karachi	2016	72	Peritoneal MDT	11	PMP, 1 CPM, 3 OV, 3 PM, 2 AC, 2
4	UoL, Lahore	2017	Not available	Individual review by professionals	11	PMP, 5 CPM, 3 OV, 3

AKU, The Aga Khan University; JPMC, Jinnah Postgraduate Medical Centre; UoL, University of Lahore; PH, Patel Hospital; MDT, multidisciplinary team; PMP, pseudomyxoma peritonei; CPM, colorectal peritoneal metastases; OV, ovarian cancer; PM, peritoneal mesothelioma; AC, appendiceal carcinoma

oncologists in the team have attended ESSO courses on peritoneal surface malignancies. In addition, one of the surgical oncologists is enrolled in the European School of Peritoneal Surface Oncology [16, 17] for obtaining a better understanding and skills in performing these complex surgical interventions.

The University of Lahore started managing patients with PSM since 2017. The patients referred are evaluated by the surgeons and the medical oncologist. They have performed a total of 11 CRS and HIPEC procedures. These include 5 pseudomyxoma peritonei, 3 ovarian cancer, and 3 colorectal cancer. The team has performed a number of cytoreductive surgeries without HIPEC for ovarian cancer but the data is not available.

Collaborative Efforts

The teams working in different parts of Pakistan have realized that all efforts must be joined together to collaborate and improve the outcomes of patients with PSM. The first step towards this collaboration was the formation of a working group on PSM including all centers actively involved in management of PSM. The working group held its first meeting in November 2018 to discuss various aspects of management of PSM as well as opportunities for collaboration, especially to formulate a registry recording outcomes of all patients with PSM. This would lead to a better, coordinated effort in improving the management of PSM in Pakistan.

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