

# Telerehabilitation of a Patient Post-buttockectomy and Internal Hemipelvectomy Secondary to Pelvic Round Cell Sarcoma during the COVID-19 Pandemic: A Case Report

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## ABSTRACT

Pelvic sarcomas are rare malignancies that can result in extensive surgeries involving bone and soft tissue resection, which can greatly improve with rehabilitation. However, due to the restrictions brought about by the COVID-19 pandemic, the rehabilitation of patients with pelvic sarcomas was affected. Limited information is also presented in the literature regarding the rehabilitation of patients with lower extremity surgeries undergoing telerehabilitation and during a pandemic. This study presents the rehabilitation process of a 43-year-old woman diagnosed with pelvic round cell sarcoma of the right gluteal area during the COVID-19 pandemic. The patient underwent wide excision, buttockectomy and internal hemipelvectomy, and we measured outcomes using the Tinetti assessment tool (TAT) and Lower Extremity Functional Scale (LEFS). A decreased risk of falls and improved functional performance were recorded using the TAT and LEFS respectively. Telerehabilitation was noted to have a good satisfaction rate among the patient and health workers.

Telerehabilitation may be an effective alternative to face-to-face therapy during the COVID-19 pandemic. More studies are needed to look into the conduct of telerehabilitation intervention among patients with bone and soft tissue surgeries.

*Key Words: telerehabilitation, buttockectomy, internal hemipelvectomy, pelvic sarcoma, case report*

## INTRODUCTION

Sarcomas are gradually enlarging tissue masses comprising less than 1% of adult malignancies.<sup>1,2</sup> These masses are often ignored until pain and compression symptoms compound the need to seek medical evaluation.<sup>1</sup> The goals of treatment are long-term survival, avoidance of local recurrence, maximized function, and minimal morbidity.<sup>1,2</sup>

Surgery along with pre- and post-operative radiotherapy achieve high rates of local control and are the standard treatment for sarcomas of the limb and trunk.<sup>1,2</sup> In patients with low- to high-grade sarcomas confined to the gluteus maximus, buttockectomy is done to remove the affected muscle.<sup>3</sup> Given the possible extensive involvement of structures and subsequent functional limitations that may arise because of this, internal hemipelvectomy has been preferred to amputation of the affected lower extremity.<sup>4,5</sup>

Early mobilization, strengthening, range of motion, and weightbearing exercises during rehabilitation management improve functional outcomes among patients with lower extremity surgeries.<sup>6,7</sup> With the onslaught of the coronavirus

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disease 2019 (COVID-19), the rehabilitation ward of the Philippine General Hospital (PGH) was closed to accommodate the influx of patients with COVID-19. Aside from this, outpatient services of the hospital were also suspended, hampering onsite or face-to-face rehabilitation.

Due to restrictions to face-to-face rehabilitation, tele-rehabilitation was a feasible alternative to continuing patient care. This study reports the telerehabilitation process of a patient who underwent wide excision, buttockectomy with internal hemipelvectomy secondary to pelvic round cell sarcoma amidst social distancing and temporary closure of face-to-face rehabilitation clinics during a pandemic.

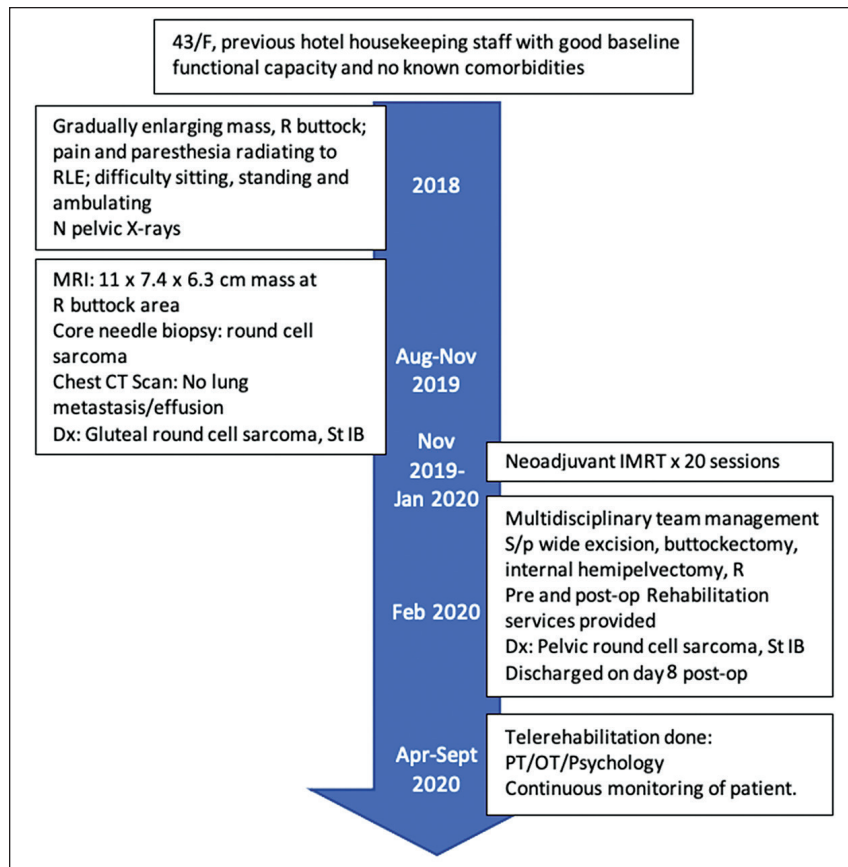
### CASE

A 43-year-old woman, a former housekeeping staff, with no known comorbidity and unremarkable baseline functional capacity presented with a two-year history of a progressively increasing mass on the right buttock, associated with pain of increasing intensity (5–8/10 on a numerical rating scale) that radiated to the right lower extremity and aggravated during sitting, standing, and ambulation. These symptoms

were associated with paresthesia of the right posterolateral leg, with no weakness, weight loss, anorexia, fever, easy fatigability, or changes in bowel and bladder habits. Initial consult revealed normal pelvic X-ray findings. The patient took unrecalled pain medications, which provided minimal and temporary pain relief.

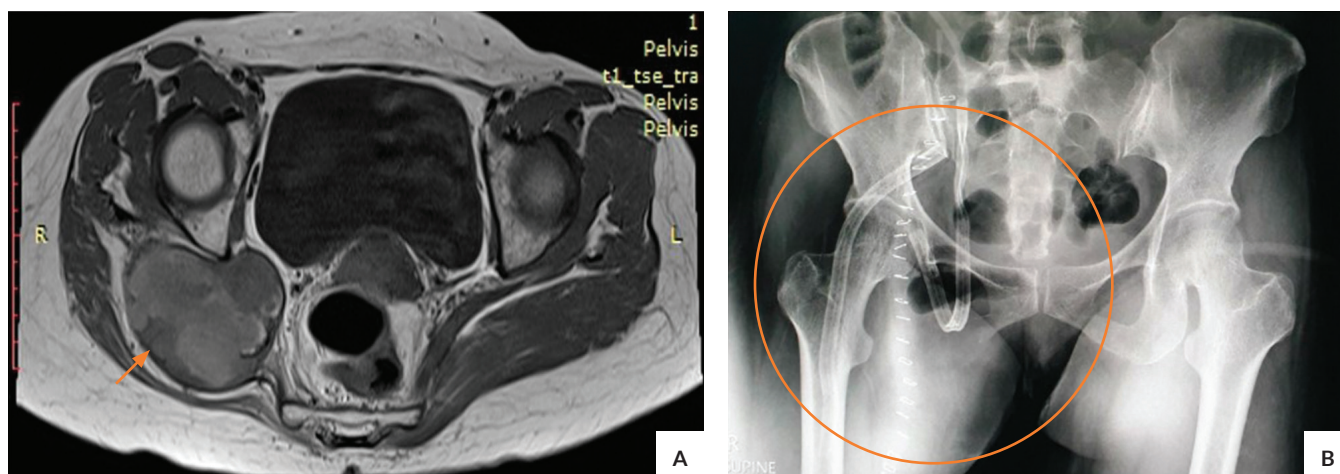
In the interim, the gluteal mass became more prominent and palpable. A magnetic resonance imaging (MRI) was requested which revealed a mass in the greater sciatic notch of the right buttock measuring 11.0 x 7.4 x 6.3 cm. The patient was then referred to PGH, where a core needle biopsy of the right gluteal mass revealed a malignant neoplasm. Immunohistochemical testing supported the diagnosis of a round cell sarcoma. Chest computed tomography (CT) scan neither showed metastasis nor effusion. The final diagnosis was gluteal round cell sarcoma on the right, Stage IB.

Three months before admission, the patient underwent 20 sessions of neoadjuvant intensity-modulated radiotherapy (IMRT), which decreased the size of the mass from 11.0 x 7.4 x 6.3 cm to 9.5 x 8.9 x 5.8 cm, with the resolution of pain and sensory deficits. Figure 1 presents the timeline of the case.



**Figure 1.** Timeline of the patient's case.

Legend: F - female, R - right, RLE - right lower extremity, N - normal, MRI - magnetic resonance imaging, CT - computerized tomography, Dx - diagnosis, St - stage, IMRT - intensity-modulated radiotherapy, S/p - status post, PT - physical therapy, OT - occupational therapy



**Figure 2.** (A) Axial T1-weighted MRI image of the pelvis post IMRT showing a bilobed shape mass at the right greater sciatic notch measuring approx 9.5 x 8.9 x 5.8 cm. (B) Postoperative pelvic X-ray (anteroposterior view) with the absence of posterior acetabular notch and inferior pubic ramus on the right side.

Legend: MRI - magnetic resonance imaging; IMRT - intensity-modulated radiotherapy.

During admission, the patient was managed by a multidisciplinary team composed of experts in both surgical and non-surgical specialties. One week from admission, the patient underwent right ureteral stenting, internal jugular catheter insertion, wide excision, buttockectomy, and internal hemipelvectomy (Figure 2).

Intraoperative findings included a solid pelvic mass, 8.0 x 9.0 cm in size, adherent to the right acetabular notch and ischium, with sparing of the ipsilateral sciatic nerve. The final diagnosis was pelvic round cell sarcoma in the right pelvis.

Post-operatively, the right hip was initially kept elevated with these hip precautions: no hip flexion beyond 90 degrees, no internal rotation beyond 30-45 degrees, and no hip adduction past midline. On the fourth postoperative day, the patient was allowed to sit, with no pressure on the right buttock. On the sixth postoperative day, the patient was cleared for standing with partial weight-bearing on the post-operative site. The patient was discharged on the eighth postoperative day and advised to follow up on an outpatient basis.

### Rehabilitation Management

Post-operatively, the goals were to provide adequate pain control, facilitate post-operative conditioning and early mobilization while observing proper hip precautions, ensure safe transitions to sitting and standing, and facilitate transfer to bedside chair in preparation for home.

NSAID and opioid medications were given to help alleviate pain. The rehabilitation program included deep diaphragmatic breathing exercises, with a range of motion exercises for both upper and lower extremities, and assisted transitions from left-lateral position to sitting with legs dangling, to standing at the bedside using a walker, with partial weight-bearing on the right with clearance from

Orthopedic surgery. On the seventh post-op day, the patient was able to tolerate short sitting with preferential weight bearing on the left to avoid pressure on the right surgical area. With moderate assistance, the patient transitioned from sitting to standing inside a walker with partial weight-bearing on the right lower extremity. On the eighth post-operative day, the patient was able to slowly slide her right foot forward and move with a walker. Before discharge, the patient and caregivers were instructed to continue range of motion exercises of both upper and lower extremities and for the patient to ambulate with a walker as was done during bedside therapy. Hip precautions were reiterated. Proper bed positioning and environmental modifications such as the installation of railings along the stairs and grab bars in the comfort room and ensuring safe walking space were given.

Because of the closure of the hospital Outpatient Department and restrictions to travel and social interactions due to COVID-19, the patient was enrolled in PGH-DRM's Telerehabilitation Program on the ninth week post-op. With benefits, risks, and limitations explained, the patient consented to participate in telerehabilitation.

Live video call exchange was done utilizing a smartphone and computer. To ensure data privacy and security, platforms with end-to-end encryption, such as Viber™, WhatsApp™, and Zoom™, were prioritized. Participants during the telerehabilitation sessions included the patient, one to two adult family members, a therapist (physical therapist or occupational therapist), and the principal investigator. The case, present problems of the patient, and goals were discussed with the therapist before start of the therapy sessions.

Telerehabilitation was started at 10 weeks post-op. Sessions lasted approximately 60 minutes each. Weekly sessions were initially carried out three times a week for five weeks and decreased to twice a week.

The main goal of the patient was to be able to ambulate independently and safely without an assistive device and to be able to return to previous activities at home. Recognizing these patient goals, the Rehabilitation Team together with the patient and with inputs from the surgery and orthopedic departments, worked together to improve strength, balance, gait, and mobility. The second was for the patient to achieve modified independence in activities of daily living and that she would be able to participate in home activities while ensuring safety at home through environmental modification.

Physical therapy exercises targeted improving limb strength, further improving static and dynamic standing balance, transitions, transfers and proprioception, and ambulation on level and non-level surfaces with an assistive device. Because of the significant improvement with physical therapy, the patient was subsequently weaned off from a walker to a single-tip cane for home ambulation and started on training for community ambulation.

Occupational therapy significantly improved the patient's independence with activities of daily living (ADLs). From being assisted in dressing of the lower extremity, moderately assisted in toileting and bathing, the patient became independent. Actual evaluation of the patient's home environment also became possible through telerehabilitation and allowed more tangible instructions on modifications. On pre-vocational assessment, the patient recognized her limitations and was open to exploration of other sources of livelihood.

With the help of the Psychology Section of the Department of Rehabilitation Medicine, the patient was assessed to be at low risk for depression, anxiety, and body image issues, which may have helped with the significant improvements in her therapy sessions. Her religion, social support, and pre-morbid coping and problem-solving skills enabled her to manage the situation.

Home instructions through a virtual demo-return demo using the video call platforms and store-and-forward

infographics sent via email were also provided. The patient participated in 16 PT, four OT, and two psychology sessions.

Factors that deferred the conduct of sessions included poor internet connectivity, patient and caregiver unavailability during the scheduled day, and patient's request to rest due to fatigue from other activities done at home.

### Clinical Outcomes

The clinician's evaluation of the patient's risk for falls was done using the TAT. The patient was monitored based on her ability to perform tasks, while seated with feet flat on the floor, during the transition to standing, and while she walked across the room using an assistive device. The total maximum score for the tool is 28 points with scores less than 19 points indicating a high risk for falls, and scores of 19-24 implying a risk for falls. The TAT is a tool to measure gait and balance with interrater reliability of 85%.<sup>8</sup>

The LEFS was used to assess the functional impairment of the patient based on her ability to perform daily activities such as putting on shoes, lifting objects from the floor, performing light and heavy activities inside the house, standing, sitting, walking, running, making sharp turns, hopping and rolling over in bed.<sup>9</sup> This is a self-reported scale where the patient rates the difficulty level of performing certain daily tasks, with higher scores proportionate to the patient's ability to perform more complicated tasks. Internal reliability of the LEFS is excellent ( $\alpha=0.96$ ) with test-retest reliability of  $R=.94$  (95% lower limit confidence interval (CI)=.89).<sup>9</sup> The minimum change in points indicating a true change in function for the patient is 9 points.<sup>9</sup> These tests that were done through telerehabilitation showed significant improvements (Table 1).

### Patient and healthcare providers perspectives

Using a 4-point Likert scale (4 - satisfied, 3 - slightly satisfied, 2 - slightly dissatisfied, 1 - dissatisfied) the telerehabilitation experience was evaluated by all participants (Table 2).

**Table 1.** Clinical outcomes during face-to-face rehabilitation and telerehabilitation

Parameters		Face-to-face Rehabilitation	Telerehabilitation		
		1 week post-op	10 weeks post-op	14 weeks post-op	18 weeks post-op
TAT	Balance	0	8	16	16
	Gait	2	4	9	10
	Total	2	11	25	26
LEFS		0	7	25	37

TAT, Tinetti assessment tool; LEFS, Lower extremity functional scale

Total TAT score is 28 points, with scores of 19-24 indicating a risk for falls and scores <19 indicating a high risk of falls. Higher LEFS scores indicate better functional performance.

**Table 2.** Patient and healthcare providers' evaluation of telerehabilitation experience

	Patient	Therapists	Physician
Process or method	4	4	4
Personnel encountered during the telerehabilitation	4	4	4
Facilities/ equipment during the telerehabilitation	4	2	
Quality of care			
Physician	4	-	-
Therapist	4	-	-
Overall satisfaction with the telerehabilitation experience	4	3	3



## DISCUSSION

With the pandemic, telerehabilitation has greatly increased. It was shown that for stroke, spinal cord injuries, paraplegia, cardiac, shoulder, knee, and hip fracture surgeries, telerehabilitation was feasible, effective in improving quality of life, and satisfaction among patients.<sup>10-12</sup> However, outcomes in these studies vary widely due to differences in techniques and programs.

A local systematic review revealed that the most common barriers to telemedicine in the Philippines were unreliable internet connectivity, lack of national e-health policies, and resistance to change among stakeholders (i.e., patients, healthcare providers, administrative personnel, and policymakers).<sup>13</sup> For this case, the patient, caregiver, and health worker's acceptance of telerehabilitation was not a problem. However, during the conduct of telerehabilitation, poor internet connection made communication difficult and led to the cancellation of sessions. Other factors that hindered telerehabilitation were patient and caregiver unavailability, patient fatigue from previous activities done before telerehabilitation and virtual assessment of the patient without any means of physical contact.

Our case of wide excision, buttockectomy and internal hemipelvectomy has shown that a comprehensive telerehabilitation program can be provided for patients with pelvic surgeries to continue their journey towards functional recovery and improved quality of life.

Soft tissue sarcomas (STS) are highly malignant tumors with local recurrence rates of 15-35% and distant metastasis rates of 20-40%.<sup>5</sup> The five-year mortality rate for high-grade lesions is 50-60%.<sup>14</sup> Given their nature, a multidisciplinary approach is necessary for management.<sup>4</sup> Work-up for patients with STS includes adequate imaging of the primary tumor, core needle biopsy, or incisional biopsy after adequate imaging, CT scan of the chest, and other ancillary diagnostic methodologies, as deemed appropriate.<sup>4</sup> Following the National Comprehensive Cancer Network guidelines, patients with Stage IB STS with no lymph node involvement and no metastasis, like our patient, are managed with surgical wide resection.<sup>4</sup> When oncologically appropriate margins or intact fascial planes are achieved, patients are monitored for recurrence. They are also referred for rehabilitation to achieve maximal functional capacity.<sup>4</sup>

In a study involving non-metastatic malignant pelvic tumors treated with pelvic resections, limb-sparing surgery was oncologically safe and had better functional outcomes than amputation surgery.<sup>15</sup> Based on Enneking and Dunham classification of pelvic resections, our patient underwent a mixed type 2 and type 3 resection.<sup>4</sup> Type 3 resections, involving the pubic rami, do not require reconstruction and most can ambulate without an assistive device.<sup>4</sup> On the other hand, pelvic resections involving the periacetabular fossa (Type 2) are usually associated with complications.<sup>4</sup>

According to the study by Markhede and Stener,<sup>16</sup> resection of only the gluteus maximus has little influence on hip extension strength and result in minimal or no impairment of function. However, with the involvement of all hamstring muscles, a significant reduction in strength happens.<sup>16</sup> With our patient, although only the gluteus maximus muscle was resected, removal of the ischium resulted in losing hamstring muscle attachment, leading to loss of its leverage power. Because of this, the patient had difficulties with transitioning from supine to sitting to standing and ambulating.

General principles in the oncologic post-surgical rehabilitation of patients involving the pelvic girdle include assisting in bed mobility and facilitating the general strengthening of the muscles in both lower extremities during the first 4-7 postoperative days. Achieving safe standing, ambulation and out-of-bed activities are other goals of management.<sup>17</sup> For our patient, standing was achieved within the first week of admission. Complicated by the pandemic restrictions and limitations in hospital service provision, rehabilitation was continued via telerehabilitation. With telerehabilitation, the patient achieved her goal to ambulate independently and she was able to return to previous activities with modifications.

## CONCLUSION

Telerehabilitation may be an effective alternative to follow-up face-to-face therapy during the COVID-19 pandemic. Although it lacks evidence compared with face-to-face rehabilitation, telerehabilitation showed generally favourable outcomes from the perspectives of the patient and healthcare providers. More studies however are needed to look into the conduct of telerehabilitation intervention among patients with bone and soft tissue surgeries.

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## Statement of Authorship

All authors contributed in the conceptualization of work, acquisition and analysis of data, drafting and revising and approved the final version submitted.

## Author Disclosure

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