

Challenging intraoperative management of pelvic resection type I,II on 33 years old woman with pelvic osteosarcoma Enneking 2B:

A case report

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Abstract

Pelvic osteosarcomas are considerably rare compare to other lesion of osteosarcoma. The anatomic proximity of the pelvis to many neurovascular structures and the urinary and intestinal tracts become a challenge of surgical procedure during excision and reconstruction. Resectability of the tumor determined through the size, extend of the lesion through the pelvic and involvement of visceral organ or local infiltration. The prognosis had also become dismal due to the danger of the surgical procedure and unsatisfying outcome postoperatively. In this report, we had follow a 33 years old woman with pelvic osteosarcoma after massive resection type I, II. Six month follow up show promising outcome though massive bleeding caused by the massive excision and reconstruction of the pelvis. This case presented is a operative procedure on pelvic osteosarcoma Enneking 2B with two step operation for resection and reconstruction, these procedure fight against massive bleeding (11 liters on the first stage), challenging anatomic reconstruction of pelvic structure to restore the function and prolonged time of operation. Non vascularized fibular graft obtained and fixated bridging the promontorium to acetabulum to restore the weightbearing axis, followed with arthrodesis of the right hip using reconplate size 3.5 mm, 14 hole. The procedure performed for the case consist of 2 stage operation. First stage, the resection consist of resection of right iliac wing and right periacetabulum region. During the procedure, the availability of packed red cell considerably important, due to massive bleeding exceeded to 11 liters. During the second stage, the reconstruction took more attention about the inflamed soft tissue. Outcome evaluation presented postoperatively, 1 month and 6 month, show better result MSTS score on evaluation during postoperative to 6 month evaluation. Radiologic evaluation also show the convenience fixation without any sign of recurrence. As studies have shown that limb-salvage techniques and the amputation show no difference in terms of the survival rate of patients with malignant bone tumors, the limb-salvage techniques are now being frequently used even for cases of advanced tumors. Therefore, when an extensive operation is necessary, careful preoperative planning followed with adequate intraoperative management according to the tumor location would be helpful in reducing the danger with satisfying result.

Keywords: *Pelvic Osteosarcoma, Pelvic resection type I,II, MSTS score clinical outcome*

1. Introduction

Pelvic osteosarcomas are considerably rare compare to other lesion of osteosarcoma.^{1,2} The anatomic proximity of the pelvis to many neurovascular structures and the urinary and intestinal tracts become a challenge of surgical procedure during excision and reconstruction.^{3,4} Most of this lesion present as a large intrapelvic mass expanded to surface

due to restrictive barrier of deep fascia.³ Resectability of the tumor determined through the size, extend of the lesion through the pelvic and involvement of visceral organ or local infiltration.⁴ The prognosis had also become dismal due to the danger of the surgical procedure and unsatisfying outcome postoperatively.^{1,3}

Limb salvage procedure performed for resectable pelvic osteosarcoma consist of

excision and reconstruction, which described as pelvic resection. This procedure classified according to Enneking and Dunham into 4 types; Iliac (T1), Acetabular (T2), Pubis or Ischium (T3) and Sacral (T4).^{3,4} The procedure selected based on the location of lesion and the involvement of the surrounding structure also come with different danger, while the outcome also considered affected by multifactorial.⁵

2. Case Illustration

We report a case of 34 years old female with diagnosis of Osteosarcoma of right iliac wing Enneking 2 B. The patient with previous complain of mass on the right iliac wing since

1 year prior to hospital admission. Since 5 years before the lump arised at the right iliac wing, patient already had complained about pain on the right iliac wing, sharp and intermitten, without previous trauma. Patient seek no medication for the treatment and consider the pain was still tolerable on her daily activity as a housewife. During the next 4 years since the pain arised, the lump began to emerged on the right iliac wing sized as marbles and slowly grow bigger. Patient also treat the lump by using herbal and massage by traditional masseur. After 4 years of inappropriate treatment, patient then took to general physician for treatment, suspected with tumor of the right iliac region.

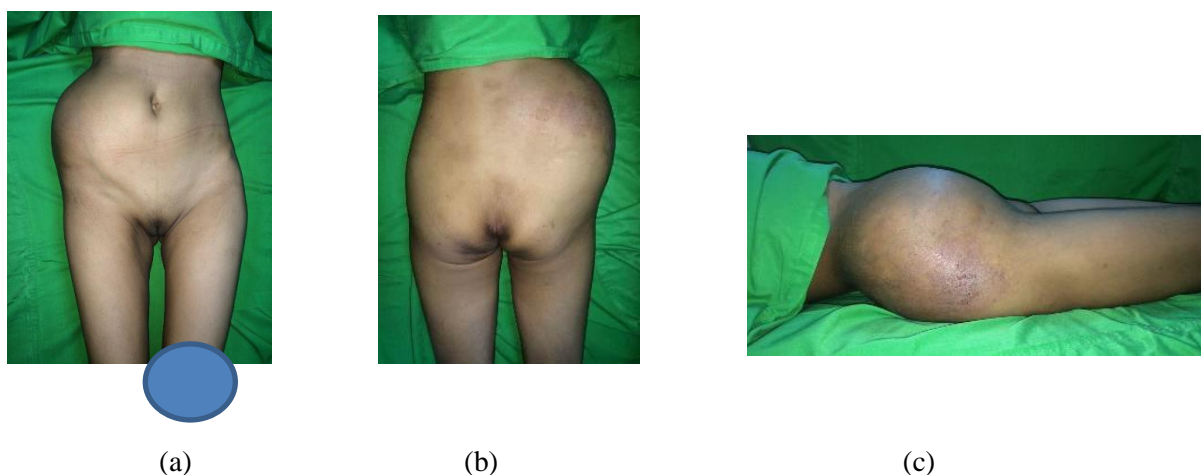


Figure 1. Appearance of right iliac mass from anterior view (a), posterior view(b) and lateral view(c)

The size of the tumor already as large as egg, also with pain which involve the right thigh region. Patient then suggested to continue the treatment to RSUD Serang, met the incharge surgeon and directly refered to RSUP Cipto Mangunkusumo for further treatment of right iliac bone tumor.

On 29th September 2015, patient arrived at Orthopaedi clinic at RSUP Cipto Mangunkusumo, performed with diagnostic examination. During physical examination, the lump on right iliac wing sized 54x31x12 cm, semicirculated at the right iliac wing. No venectation or wound, the skin colour found

similar to the surrounding. The lump also palpated firm pain on palpation, warm and fixated on the right iliac region.

Already performed with radiology examination on August 8th, 2015, evaluation of the plain xray show that the mass on the right iliac wing shown as lytic lesion with chondroid matrix expanded from the upper crest of right iliac wing to upper part of the right acetabulum, also extend to mid part of.

The MRI examination show the mass of right iliac wing consist of cystic, calcsified and necrotic area on central of the mass, sized 15,9x14,3x12,6 cm which also infiltrate part of

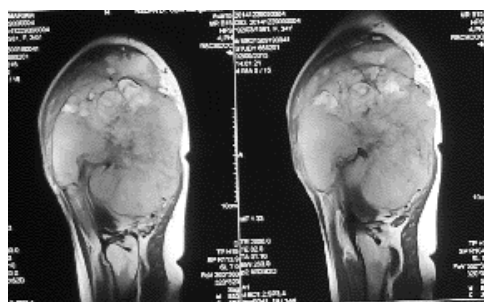
right iliac muscle, part of Psoas major muscle, and altered the main iliac artery and vein to the medial side. The mass also expanded to upper part of right abdomen region without involvement of right kidney and other intestine.



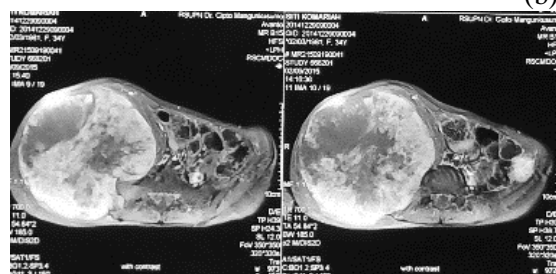
Figure 2. Radiology of Pelvis (a) show lytic lesion with ill defined and expand to right upper region of iliac wing



(a)



(b)



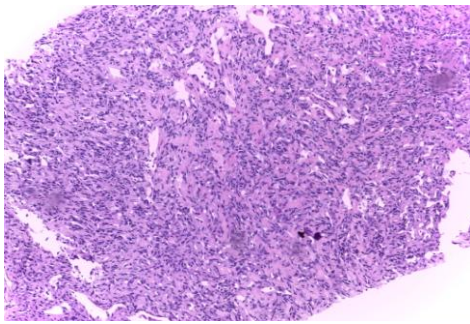
(c)

Figure 3. MRI of pelvis show the mass located on the right iliac wing sized 15,9x14,3x12,6 cm, localized on the right iliac wing involved the upper part of the acetabulum, without lesion expanded to other region.

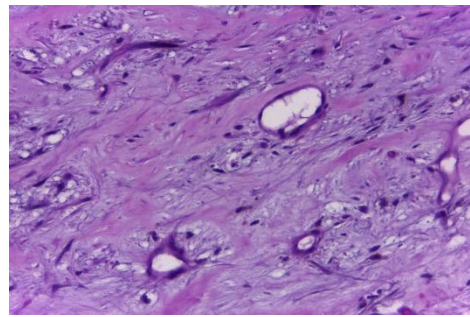
Laboratory finding indicate the presence of the malignant tumors through anemia (Hb 10.5), elevation of sedimentation rate (40mm). The result also convinced no involvement of internal organ, through normal result of other laboratory finding. The mass on the iliac wing had also possibility of other metastatic tumor or infection, so we decide to examine other tumor marker and infection marker. Result of the tumor markers also shown no indication of metastatic lesion nor infection, though the rate of lactate

dehydrogenase (LDH 721 U/L) and Alkali Phosphatase raised (Alkali Phosphatase 230 U/L).

In order to completed the examination, we also perform core biopsy to examine the lump which result with the present of pleomorphic cells, some are giant and present numerous and atypical mitotic figures. The matrix also consist of osteoid matrix and irregular trabeculae with central calcification and cartilage matrix. This appearance concluded as the conventional type of osteosarcoma.



(a) 40 times magnifying



(b) 400 times magnifying

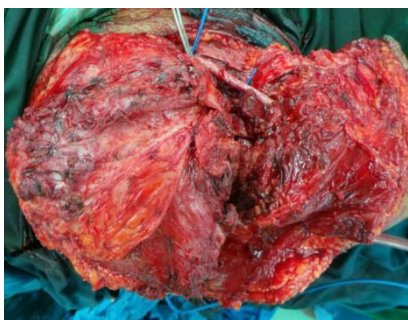
Figure 4. Histopathologic slide obtained from core biopsy present of pleomorphic cells and osteoid matrix with central calcification and cartilage matrix.

Confirmation of the completed examination, the patient followed clinicopathological conference (CPC) on November 4th, 2015, and through the examination, the patient concluded as Osteosarcoma of right iliac wing, Enneking 2B, and planned to performed limb salvage surgery with pelvic resection.

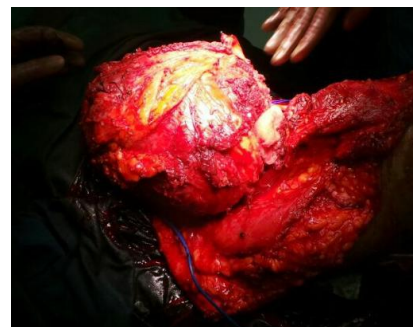
The consideration of the resectable state result from the completed examination shown no involvement of intestine, bladder, or neurovascular. Extention mass of the iliac wing to periacetabular considered as the main challenge to perform the type I and II pelvic resection. The resection should also followed with reconstruction of the pelvic to allow the force of body weight through the body axis to right lower leg.

Patient underwent two stage operation on 4th and 11th November 2015. The first stage on November 4th 2015 underwent resection of the tumor, resected medially from sacroiliac joint, extended to periacetabular

region. Intraoperative, we found no involvement of internal organ, and the preserved neurovascular. During this stage, the excision performed in 6 hours and result to a massive 11.000 mL bleeding. Postoperatively, the soft tissue swelling and massive blood loss treated intensively in ICU for 6 days. The second stage operation, reconstruction procedure performed on November 11th, aimed at reconstruct the right pelvic side. The reconstruction started with harvesting of right fibula without its vascularization to perform the bone graft. The fibula divide into 2 similar sized fibula, bridging the sacrum to upper side of right periacetabular and fixated with 3.5mm, 10 hole recon plate. To ensure the stability of the pelvis and right leg connection, we also perform arthrodesis by adding fixation of right superior pubic bone to head of femur and right subtrochanter using bended 3.5 mm reconplate 14 hole.



(a)



(b)

Figure 5. Exposed osteosarcoma on the right iliac wing (stage 1 pelvic resection)

During the first stage, the pelvic resection performed 5 cm away from the tumor site, so that the excision extended from type 1 (iliac resection) to type 2 (periacetabular resection). This operation result to the need of more complex reconstruction which need the application of the bone graft and supporting structure to fixate the bone graft and transfer the biomechanic of the sacrum to the lower leg.

For that purpose, we use non vascularized fibular graft to connect the right periacetabulum to promontorium, then fixated with the bended recon plate 3.5 mm. The fixation also applied from upper part of the right superior ramus pubic bone extended to proximal shaft of right femur.

2. Discussion

The procedure performed for the case consist of 2 stage operation. First stage, the resection consist of resection of right iliac wing and right periacetabulum region. During the procedure, the availability of packed red cell considerably important, due to massive bleeding exceeded to 11 liters. During the second stage, the reconstruction took more attention about the inflammed soft tissue. Outcome evaluation presented postoperatively, 1 month and 6 month, show better result MSTS score on evaluation during postoperative to 6 month evaluation. Radiologic evaluation also show the convenience fixation without any sign of recurrence.

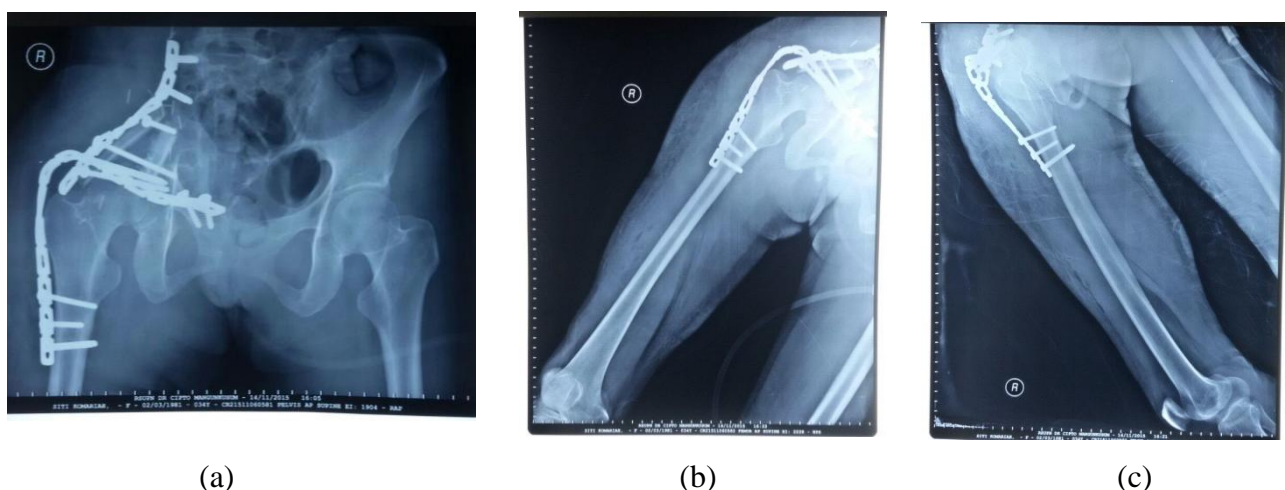


Figure 6. Post operative xray after the pelvic resection type I and II, and fixation using free vascularized fibular graft and 3.5 mm recon plate.

The mass of tumor resected by the operation procedure examined histopathologically as shown bellow. The mass size 38x24x9 cm with grey colour substances. The histopathologic data also shown similar result as the conventional osteosarcoma.

After the surgery, patient take 16 days of inpatient and during the postoperative period, we perform evaluation by scoring the MSTS Score. During the evaluation of the functional outcome, we found the better

progress of the functional, indicated by the higher score of the MSTS evaluation.

Compare the result to the literature, when excision of a pelvic tumor and reconstruction have been combined in one procedure, the reported complication rate has been high, ranging from 30-90%.⁶ Carter et al.⁷ reported that a hindquarter amputation without reconstruction was associated with a 41% complication rate in a series of thirty-four patients.

Table 1. MSTS score result from postoperative, 1 month, 3 month and 6 month evaluation

| PERIODE EVALUATION | EVALUATION | | | | | | SCORE |
|-----------------------|------------------------|----------------------------|---------------------|-------------------|------------------------|-----------------------|-------|
| | PAIN | FUNCTION | EMOTIONAL | SUPPORTS | WALKING | GAIT | |
| Post Operative | Severe disabling(0) | Total restriction (0) | Dislikes(0) | Wheelchair (0) | Not Independent (0) | Major Handicap (0) | 0 |
| 1 Month | Moderate (1) | Total restriction (0) | Accept (1) | Wheelchair (0) | Not independent (0) | Major Handicap (0) | 2 |
| 3 Month | Intermediate (2) | Partial restriction (1) | Intermediate (2) | One Cane (1) | Inside Only (1) | Major Cosmetic(1) | 7 |
| 6 Month | Intermediate (2) | Partial restriction (1) | Satisfisfied (3) | One Cane (1) | Inside Only (1) | Major Cosmetic(1) | 8 |

The reported durations of operations in this case report took 6 hours and 4 hours, with blood loss of the first stage exceed 11.000 mL. By literature, the time of surgery that included both pelvic resection and pelvic reconstruction have been high, ranging from five to ten hours, with blood loss ranging from 2500 to 8300 mL depending on the extent of the reconstruction.⁸ The data in our study are consistent with those findings. Neurological problems were the most frequent surgical complications, with a prevalence of 25%, and were exclusively observed in patients with a periacetabular resection (zone II),⁹ although we found no neurologic deficit after the we perform the surgery.

3. Conclusion

Due to this result, surgery should be considered only when the tumor can be completely removed. The role of surgery for less radiosensitive tumors, such as osteosarcomas, and for nonresponsive tumors, such as chondrosarcomas, is more obvious.

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