

Case Report

EXCISION OF RECURRENT HEMANGIOMA IN HAND WITH RECONSTRUCTION USING ABDOMINAL FLAP

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ABSTRACT

Hemangiomas are known for their typical involution with age. However, around 40% of cases require intervention. Hemangioma in hand is challenging because the hand function and the aesthetic appearance need to be preserved. Hereby we reported a 21-year-old woman with a recurrent hemangioma on the left hand in Abdul Wahab Sjahranie Hospital, Samarinda, Indonesia. The patient's previous surgery was ineffective since the mass reappeared in the same area. We performed surgical excision and reconstruction with an abdominal flap. One-month and one-year postoperative follow-up indicated good flap viability and preserved hand functions without the need for amputation. This report also emphasizes the importance of collaboration from multiple surgical and medical fields to allow favorable outcomes in this case.

Keywords: Hemangioma; vascular tumor; benign vascular tumor; abdominal flap; hand surgery; good health and well-being

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3. Hemangioma of the hand is a challenging case due to the need to maximize eradication of the mass while minimizing damage to the healthy tissue to preserve the physiologic function of the hand.
2. The reconstruction of the defect also needs to be taken into account to maintain the cosmetic appearance.
3. Collaborative multidisciplinary work is essential to achieve these demands and maintain the patient's quality of life.

INTRODUCTION

Hemangioma is a relatively common benign proliferative lesion of vascular tissue origin. It is known for its typical occurrence during infancy and involution with age, usually negating the need for invasive treatment. Nevertheless, cases of recurrence that might require further intervention are also present (Richter & Friedman 2012). Hemangioma develops

most commonly in subcutaneous adipose tissue but a rare emergence in muscles might occur. This lesion is most frequently found on the thigh (Wierzbicki et al. 2013), while the upper extremity is an uncommon site, only accounting for 15% of cases (Jacobs et al. 2010). Hemangioma of the hand is particularly challenging. In this study, we emphasized the importance of collaborative work to provide comprehensive management. The mass has to be completely excised

while maintaining as much physiologic function of the hand as possible to allow daily activities. Apart from the physiologic function, we also noted the need to maintain the cosmetic appearance of the hand, particularly in a young woman, to maintain the patient's quality of life. We hereby presented a case report describing the excision of recurrent hand hemangioma that was reconstructed with an abdominal flap. Informed consent had been obtained from the patient for publication of the case report and accompanying images.

CASE REPORT

A 21-year-old woman was admitted to our hospital because of a mass on her left hand. The mass has been there since birth and was operated upon at the age of four, but reemerged on the same site. It was located on the medial palmar side of the left hand with compressible and soft consistency (Figure 1). There was no thrill or bruit on physical examination.



Figure 1. Hemangioma on the medial left palmar region

MSCT angiography revealed a subcutaneous soft tissue mass and calcification on the medial side of the left hand with indistinct borders suggestive of hemangioma (Figure 2).

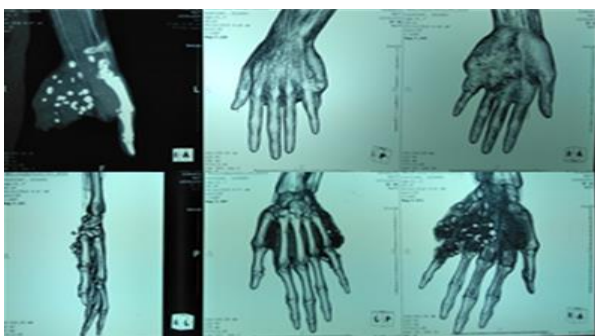


Figure 2. MSCT angiography revealed a subcutaneous soft tissue mass with calcification and indistinct borders

Surgical excision was performed. An 8 x 6 cm mass infiltrating the muscles and fascia was excised, resulting in a large defect on the medial palmar side.

This was simultaneously reconstructed with an abdominal flap (Figure 3).



Figure 3. (A-C) An 8 x 6 cm mass infiltrating the muscles and fascia was excised, resulting in a large defect on the medial palmar side of the hand. (D-E) The resultant defect was reconstructed with an abdominal flap

Aside from being the patient's choice, we settled for a random pattern abdominal flap since it has more versatility and a relatively short surgery time. The cosmetic appearance was another point of consideration. The resultant scar was positioned on the inguinal area that is easier for the patient to conceal with clothing, while a free flap would have left a quite visible scar on the thigh. Histopathologic evaluation of the excised mass confirmed a capillary hemangioma (Figure 4).

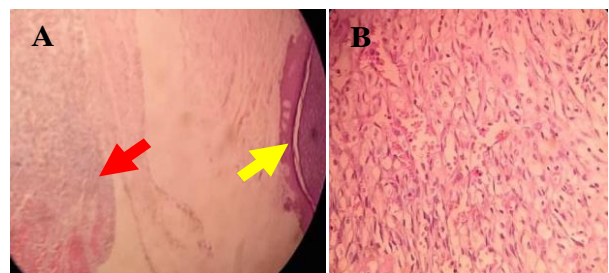


Figure 4. (A) Microscopic examination showing (red arrow) an area with hemangioma adjacent to (yellow arrow) the skin epidermis. (B) Small blood vessels lined with endothelial cells containing red blood cells (hematoxylin and eosin staining; 100x and 400x magnification)

The flap was divided after 21 postoperative days to provide sufficient time for neovascularization. The flap was re-evaluated after one month and one year following the surgery (Figure 5). The postoperative investigation included skin color, temperature, capillary refill time, and signs of hematoma, all of which were normal, indicating the flap's viability. All



clinical outcomes remained as mentioned and there were no signs of tumor recurrence after one year of follow-up. The hand functionality was also preserved.



There was a slight contracture on the fifth finger which was further followed up by a plastic surgeon.

Figure 5. Evaluation on (A) one-month and (B-C) one-year follow-up exhibited good clinical outcomes with preserved hand functions. There were no clinical signs of recurrence within a one-year follow-up

DISCUSSION

Hemangiomas are the abnormal proliferation of blood vessels that may develop in any vascularized tissue. They may be asymptomatic or may cause symptoms such as pain and swelling (Katz & Damron 2021). Hemangioma is experienced by 7% to 10% of infants (Jacobs et al. 2010), making it a relatively common tumor in infancy. It might be present at birth or arise during early childhood, the latter being much more prevalent. A small number of cases that are linked to trauma might also be found (Wierzbicki et al. 2013). It is classified as a benign vascular tumor with typical developmental phases, including proliferation in which the lesion undergoes rapid growth, followed by dormancy, and involution (Richter & Friedman 2012, Shah et al. 2014). Involution generally occurs within the first few years of life. This is in contrast to another entity of vascular anomalies, vascular malformations (i.e., arteriovenous malformations, capillary malformations), which do not undergo the involution phase. A hemangioma can be histologically classified into capillary and cavernous forms based on its vascular network. Capillary hemangioma consists of small capillaries each lined by a single layer of endothelial cells (Kumari et al. 2015), whereas cavernous hemangioma is composed of large, dilated vessels with thin walls (Kamala et al. 2014).

Hemangioma makes up 7% of all benign soft tissue tumors (Wierzbicki et al. 2013). It mostly affects the upper extremity (15%) and largely occurs in subcutaneous adipose tissue. Intramuscular emergencies are rare, accounting for less than 1% of hemangioma, most of which are located in the thigh (36%) and the calf (17%) (Wierzbicki et al. 2013).

Most intramuscular hemangiomas are self-limited and invasive interventions bear varied outcomes; therefore, surgical intervention is unnecessary unless indications are compelling. Thrombocytopenia, intractable pain, rapid tumor growth, local skin necrosis risk, cosmetic or functional impairment, and malignancy suspicion may necessitate surgical intervention (Mitsionis et al. 2010, Tang et al. 2002). An average symptom duration at an initial presentation is 13 months, chronic extremity pain should increase suspicion of an intramuscular hemangioma (Kiran et al. 2012, Wild et al. 2000).

A new mass and chronic pain are the most common presenting symptoms (Kryzak & DeGroot 2008). In cases of bleeding, ulceration, excessive pain, the risk for cosmetic disfigurement, and other functional impairment corresponding to the affected area, surgery may be considered. Around 18% to 61% of cases might recur, incomplete excision being the greatest risk factor. Wierzbicki et al. (2013) and Lu et al. (2017) reported a persistent recurrence of intramuscular hemangioma despite repeated surgeries, resulting in multiple physiologic insults and sufferings on the patient's side. Considering the patient's overall well-being, the right upper limb was amputated without the patient's consent. Our case reflected the need for surgery due to functional impairment and cosmetic indications in a young woman.

Conservative management is the first line of treatment for nearly all isolated intramuscular hemangiomas (Henderson et al. 2010). The reconstruction of skin defects of the hand and forearm aims at restoring their function with a good aesthetic appearance (Ali et al. 2007). Soft tissue reconstruction for large defects of the hand remains a challenge due to the need to restore its physiologic function and maintain a good appearance. Several options of reconstruction techniques are available depending on the general condition of the patient and the local condition of the wound and donor site. Some commonly used techniques are random pattern flap, axial pattern flap, and free flap (Chen et al. 2021, Monreal et al. 2017).

Axial pattern reverse radial forearm flap can be used for hand defect reconstruction (Hawary 2020). It is safe, simple, only involves a one-stage procedure, and provides sufficient tissue coverage with robust vascularization for a good flap outcome. A major drawback is that it sacrifices a major artery, consequently jeopardizing the donor site and hand viability (Ali et al. 2007). In our case, this method was not chosen since there was suspicion of ulnar artery incompetence due to the hemangioma. This would further harm the hand viability. A free flap is another reconstruction technique that can be used. However, this procedure takes considerably longer and requires a more complex technique as well as complicated

postoperative care (Ali et al. 2007, Monreal et al. 2017).

Abdominal flap for the reconstruction of soft tissue defects on the dorsum of the hand distant flap had a long-time role. A random pattern abdominal flap is frequently used to cover traumatic defects involving the hand. However, the bulkiness of the flap and the two-stage procedure are the main disadvantage of the abdominal flap. In particular, the bulkiness of the flap is bothersome to the patient and is frequently subjected to debulking surgery. In this work, abdominal thin skin flaps were raised and reconstructed (thirty soft tissue defects on the dorsum of the hand and forearm) with a maximum of 9 x 16 cm flap dimension. All flaps had survived. Furthermore, the flaps were thin that did not require revision (Ali et al. 2007). Lin et al. (2005) used the pedicled skin flaps of the subdermal vascular plexus for the reconstruction of hand defects. They achieved complete survival in all the flaps used to reconstruct 22 hand defects.

The abdominal flap has long been used as a modality to cover soft tissue defects, such as the upper extremities and following mastectomy. In the case of upper extremity defects such as that in our study, this approach generates a bulky flap and requires a two-stage procedure flap (Ali et al. 2007), which opposes the general goal of an efficient surgery. Nevertheless, our team settled for a random pattern abdominal flap since it has more versatility, relatively shorter surgery time, as well as being the patient's method of choice. The choice of the flap is mainly based on the anatomical location and size of the defect.

The positioning of the flap can be modified to fit the size of the defect and the patient's comfort. The hand may be supinated or pronated accordingly. In our case, the hand was supinated to accommodate the location of the defect. Follow-up was done in one month and one year postoperatively. The patient had slight contracture on the fifth finger but the overall hand functions (basic functions such as grasping objects and more advanced functions such as writing, cutting) were preserved to carry out daily activities. The viability of the flap was good with normal skin color, temperature, and capillary refill time. No signs of hematoma and tumor recurrence were observed.

Strength and limitation

The case report highlights a challenging case of a recurrent hemangioma in a difficult location, emphasizing the need for appropriate intervention. The use of surgical excision and reconstruction with an abdominal flap is a unique approach that may be useful for other similar cases. The report provides evidence of successful treatment with good follow-up results, indicating the effectiveness of the intervention. The report is limited to a single case, and therefore the generalizability of the findings may be limited.

CONCLUSION

Surgical intervention is still the treatment of choice for recurrent hemangioma. Excision of hemangioma on the upper extremity poses a challenge due to the need to maximize tumor eradication while minimizing damage to normal functions. Comprehensive management involving multiple surgical and medical fields was substantial to maintain physiological functions and cosmetic appearance. The resultant defect of excision could be reconstructed using an abdominal flap with a satisfactory clinical outcome.

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Conflict of interest

None0

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Author contribution

Contribution: All authors contributed equally and significantly to the study. All authors read and approved the final manuscript. Correspondence: c.wahab@tu.ac.id

REFERENCES

- Ali A, Farag M, Safe K (2007). Reconstruction of hand and forearm defects by abdominal thin skin flaps. *Egypt. J. Plast. Reconstr. Surg.* 31, 181–185.
- Chen H, Chen B, Li B, et al (2021). Gastrodin promotes the survival of random-pattern skin flaps via autophagy flux stimulation. *Oxid. Med. Cell. Longev.* 2021, 1–16.
- Hawary Y (2020). Usage of reversed radial forearm flap for reconstruction of hand and wrist defects. *Egypt. Soc. Plast. Reconstr. Surg.* 44, 47–51.
- Henderson J, Wierzbicki J, Clugston J, et al (2010). Ten years of lower leg pain: Intramuscular hemangioma. *Med. Sci. Sport. Exerc.* 42, 1–5.
- Jacobs B, Anzarut A, Imbriglia J (2010). Vascular anomalies of the upper extremity. *J. Hand Surg. Am.* 35, 1703–1709.
- Kamala K, Ashok L, Sujatha G (2014). Cavernous hemangioma of the tongue: A rare case report. *Contemp. Clin. Dent.* 5, 95–98.
- Katz D, Damron T (2021). Orthopedic surgery for hemangioma. Available from <http://emedicine.medscape.com/article/1255694-overview>. Accessed January 26, 2021.

- Kiran K, Babu T, Babu S, et al (2012). Skeletal muscle haemangioma: A cause for chronic pain about the knee: A case report. *Case Rep. Orthop.* 2012, 1–6.
- Kryzak T, DeGroot H (2008). Adult-onset flatfoot is associated with an intramuscular hemangioma of the posterior tibialis muscle. *Orthopedics* 31, 280.
- Kumari V, Vallabhan C, Geetha S, et al (2015). Atypical presentation of capillary hemangioma in oral cavity- A case report. *J. Clin. Diagnostic Res.* 9, 26–28.
- Lin W, Zheng T, Wang Q (2005). Study on the effect of pedicle skin flap of subdermal vascular plexus on repairing the hand injury. *Zhongguo Xiu Fu Chong Jian Wai Ke Za Zhi* 19, 528–530.
- Lu H, Chen Q, Yang H, et al (2017). Aggressive intramuscular hemangiomas in the upper extremity: A case report. *Med.* 96, 1–5.
- Mitsionis G, Pakos E, Kosta P, et al (2010). A intramuscular hemangioma of the foot: A case report and review of the literature. *Food Ankle Surg.* 16, 27–29.
- Monreal R, Gomez D, Osinaga G, et al (2017). Reconstruction of the hand defects by pedicled abdominal thin skin flaps. *Juniper Online J. Orthop. Orthoplastic Surg.* 1, 1–4.
- Richter G, Friedman A (2012). Hemangiomas and vascular malformations: Current theory and management. *Int. J. Pediatr.* 2012, 1–12.
- Shah P, Maganur P, Bhat M, et al (2014). Capillary hemangioma in maxillary anterior region: A case report. *Int. J. Clin. Pediatr. Dent.* 7, 144–147.
- Tang P, Hornicek F, Gebhardt M, et al (2002). Surgical treatment of hemangiomas of soft tissue. *Clin. Orthop. Relat. Res.* 399, 205–210.
- Wierzbicki J, Henderson J, Scarborough M, et al (2013). Intramuscular hemangiomas. *Sports Health* 5, 448–454.
- Wild A, Raab P, Krauspe R (2000). Hemangioma of skeletal muscle. *Arch. Orthop. Trauma Surg.* 120, 139–143.