CHAPTER 113
Unilateral Limb Enlargement

Charles F.M. Evans
Jacob N. Legbo

Introduction

Unilateral limb enlargement (ULE) is a challenging diagnostic and management problem. Treatment options are often complex and are dependent upon accurately determining the correct aetiology for each individual case. Although the enlargement may be mild and may pass unrecognised, it can attain a tragically distorting and grotesque dimension, leading to significant functional, cosmetic, and psychological complications. The complex nature of this problem, combined with the rarity in presentation, has led to inconsistencies in management that need to be addressed.

Demographics

The exact incidence of ULE within Africa is not fully known. This is due to both the difficulties in obtaining accurate epidemiological studies for any rare condition within Africa and a lack of consistency in the actual diagnosis of the problem, with frequently misused terminology and nomenclature especially relating to the causes of this condition.[1]

Limb Embryology

Limb development takes place over a 5-week period from the 4th to 8th weeks of embryological life.[2] Development of the upper and lower limbs is similar, although morphogenesis of the upper limb is usually about 1–2 days ahead of the lower limb, and at 7 weeks the limbs rotate in opposite directions (the upper ones rotating laterally 90°, so that the extensor muscles lie on the lateral and posterior surface and the thumbs lie laterally, whereas the lower ones rotate 90° medially, placing the extensor muscles on the anterior surface and the big toe lies medially).[3]

Upper limb buds form on the ventrolateral wall at about the level of C5 to T1, and lower limb buds form at about L1 to L5. Each bud consists of a mesenchymal core (derived from lateral plate mesoderm) covered by a layer of cuboidal ectoderm. This ectoderm thickens to form an apical ectodermal ridge along the distal margin of the limb bud to maintain outgrowth of the limb bud along the proximal-distal axis.[3]

The terminal portions of the limb buds become flattened to form the handplates and footplates, which are separated from the proximal segment by a circular constriction. Digital rays appear on the hand and foot plates, with fingers and toes formed by a process of programmed cell death between these rays.[2] A second constriction divides the proximal portion into two segments, enabling the main parts of the extremities to be recognised.[3] The bones, tendons, and other connective tissues of the limb arise from the lateral plate mesoderm, but the limb muscles and endothelial cells arise in the somatic mesoderm and migrate into the limb buds.[2]

Congenital limb anomalies are rare, occurring in approximately 6 per 100,000 births.[3] Anomalies fall into four categories:[2]

- *reduction defects*—either the entire limb (amelia) or part of the limb (meromelia) is missing;

- *duplication defects*—supernumary of limb elements, such as polydactyly (presence of extra digits);

- *dysplasias*—limb fusions, such as syndactyly (digit fusion); or

- *disproportionate growth*—limb is abnormally larger, smaller, longer, or shorter.

Primary limb enlargement may be associated with conditions such as Beckwith-Wiedemann syndrome, McCune-Albright syndrome, Proteus syndrome, macrodactyly, and isolated hemihypertrophy.[4,5] To date, no definite documented report of a teratogen-induced limb enlargement has appeared.

Aetiology

A wide range of differentials can cause ULE, both congenital and acquired. It may occur as an isolated abnormality or as part of a syndrome (hemihyperplasia syndromes are a heterogenous group of disorders with asymmetric limb growth being the primary finding).[6] The most common cause for ULE in the developing world is secondary lymphoedema as a result of lymphatic filariasis. Worldwide, more than 120 million people have been affected by the disease, of which more than 40 million are seriously incapacitated and disfigured. One-third of all cases occur within Africa.

Although ULE is primarily thought to be a disease of adulthood, occurring only sporadically in children, the increasing sensitivity of tests to detect the responsible parasites has demonstrated that infection often occurs in childhood but remains subclinical for many years.[7] Given the wide range of differentials causing ULE in children, it is helpful to consider the anatomical structures within the limb when attempting to determine the cause (see Table 113.1).

Lymphoedema

Lymphoedema is a progressive pathological condition in which there is interstitial accumulation of protein-rich fluid and subsequent inflammation, adipose tissue hypertrophy, and fibrosis. It is caused by lymphatic transport dysfunction and most commonly affects the limbs, with the resulting swelling potentially leading to disfigurement as well as decreased mobility and function.[8] Lymphoedema can be either congenitally determined (primary) or as a consequence of acquired lymphatic failure due to obstruction or damaged lymphatics (secondary).[9] The lymphatics could be aplastic, hypoplastic, or hyperplastic.

Primary lymphoedema is rare, affecting 1.5 per 100,000 population younger than 20 years of age.[10] It is subdivided into categories according to the onset of symptoms:[8]

- congenital hereditary lymphoedema (Milroy disease) presents at birth or within the first two years of life;

- familial lymphoedma praecox (Meige disease) typically presents during puberty; and

- lymphoedema tarda presents spontaneously after 35 years of age.

Worldwide, secondary lymphoedema accounts for about 90% of both paediatric and adult cases of lymphoedema. The most prevalent cause of secondary lymphoedema is filariasis secondary to infection with the filarial worms *Wuchereria banrofti* and *Brugia malayi*. Secondary lymphoedema is a mosquito-borne disease in which adult filarial worms lodge in the lymphatic systems, thus obstructing lymphatic vessels and

Table 113.1: Causes of unilateral limb enlargement in children.

System	Cause of limb enlargement

Lymphatics	**Primary lymphoedema**
	    Congenital lymphoedema (Milroy disease)
	    Lymphoedema praecox (Meige disease)
	Secondary lymphoedema
	    Infection—filariasis, mycobacterium
	    Inflammation—dermatitis, sarcoidosis,
	      psoriasis, rheumatoid arthritis
	    Trauma—lymphadenectomy, burns,
	      radiotherapy, scarring
	    Obstructing tumour

Vascular	**Vascular tumours**
	    Haemangioma, tufted angioma (TA),
	    Kaposiform haemangioendothelioma (KHE)
	Slow-flow vascular malformations
	    Capillary malformations (CM), venous malforma-
	tions (VM), lymphatic malformations (LM).
	Fast-flow vascular malformations
	    Arteriovenous fistula (AVF)
	    Arteriovenous malformation (AVM)
	Combined/complex vascular malformations
	    Klippel-Trenaunay syndrome (CLVM)
	    Parkes-Weber syndrome (CAVM)
	    Proteus syndrome.
	    CLOVE syndrome

Soft tissue/ neuromuscular	Lipoblastoma—lipoblastomatosis Neurofibromatosis type 1 Macrodystropyhia lipomatosa Hemihyperplasia multiple lipomatosis syndrome Syringomyelia
Skeletal	Osteomyeltis Bone tumours

disrupting lymphatic transport.[8] In Africa, scarring of inguinal/axillary lymph nodes from repeated nonspecific infections is also a common occurrence. Occasionally, chronic, specific infection from organisms such as *Mycobacterium tuberculosis* may result in lymphoedema of the limb. In the Western world, nearly all cases of secondary lymphoedema are related to malignancy or its therapy (surgery and/or radiotherapy), and paediatirc cases are nearly always classified as primary.[9]

Vascular

In an attempt to prevent confusion and inappropriate treatment, vascular anomalies are now classified by using a system based upon their physical characteristics, natural history, and cellular features (see Table 113.1).[11,12] Haemangiomas are benign neoplasms characterised by vascular endothelium that proliferates. In contrast, vascular malformations (capillary, venous, lymphatic, arterial) are characterised by mature endothelial cells that do not grow rapidly, proliferate, or involute.[12,13] Although rare with haemangiomas, vascular malformations involving the limbs have been found to be associated with hypertrophy of the underlying soft and skeletal tissues.

Several clinical syndromes involve complex vascular malformations with an associated ULE. Klippel-Trenaunay syndrome is a slow-flow malformation involving abnormal capillaries, lymphatics, and veins characterised by a triad of portwine stain, varicose veins, and skeletal and soft tissue hypertrophy.[14] Parkes-Weber syndrome is similar, except for a combined fast-flow vascular arteriovenous malformation (AVM) in association with a cutaneous capillary malformation and skeletal or soft tissue hypertrophy.[1] Proteus syndrome is a progressive sporadic overgrowth disorder that is extremely rare and of unknowm aetiology.[15] Overgrowth can affect any tissue, but most commonly involves bone, connective tissue, and fat. Vascular malformations are frequently seen and are usually capillary or venous. The overgrowth in Proteus is distinct in that it causes distortion of the skeletal system.[15,16] Proteus overlaps with several other asymmetric overgrowth syndromes, including hemihyperplasia-multiple lipomatosis (HHML) syndrome and congenital lipomatous overgrowth, vascular malformations,

and epidermal naevi (the so-called CLOVE syndrome, standing for Congenital Lipomatous Overgrowth, Vascular alformations, and Epidermal naevi).[16]

Soft Tissue/Neuromuscular

Excessive deposition of fatty/fibrous tissue can result in limb enlargement, especially if deep and diffuse.[17] There is also growing evidence that the peripheral nervous system has an important role in limb size regulation, with peripheral nerve abnormalities resulting in limb overgrowth.[4] Soft tissue overgrowth can affect skin, fat, lymphatic, or nerve structures, although flexor tendons and blood vessels may be spared. This means that although the tissues may be abundant in a limb, they have a relatively poor blood supply.

Lipoblastoma and lipoblastomatosis are rare benign soft tissue tumours that occur almost exclusively in infants and children, resulting from proliferation of primitive adipocytes. Lipoblastoma is encapsulated and more likely to be superficial, whereas lipoblastomatosis is infiltrative and likely to be deeply situated.[18,19] Neurofibromatosis type 1 is an autosominal dominant condition with several clinical forms including elephantiasis nervorum, which includes neurofibromas of the extremities that cause greatly thickened skin stimulating limb hypertrophy.[20] Macrodystrophia lipomatosa is a rare form of localised gigantism characterised by progressive overgrowth of all the mesenchymal elements with a disaproportionate increase in the fibroadipose tissues. This congenital abnormality occurs most frequently in the distribution of the median nerve in the upper extremity and in the distribution of the planter nerves in the lower extremity.[21] HHML syndrome is a rare hemihyperplasia syndrome that is similar in presentation to the Proteus syndrome except that patients show only moderate abnormalities of asymmetry and overgrowth combined with subcutaneous lipomata.[22]

Syringomyelia is another rare cause of limb enlargement that can result in hypertrophy of the soft tissue and skeletal components of the limb. Neurogenic hypertrophy has been postulated to be the result of stimulation of the sympathetic nervous system, causing defective circulation and oedema; others believe muscle hypertrophy occurring in syringomyelia is secondary to neural abnormalities.[23–25]

Skeletal

In infants, acute haematogenous osteomyelitis may be complicated by the arrest of growth and shortening of the bone or limb due to physeal damage. In older children, however, the bone (along with the soft tissues) occasionally grows too long because of metaphyseal hyperaemia, which subsequently stimulates the growth plate. This, however, leads more to limb length discrepancy, as transverse enlargement is usually minimal.

Primary bone tumours are rare but account for a significant proportion of cancers occurring in children. The most common primary malignant tumours are osteosarcoma and Ewing's sarcoma. The most common benign bone tumours are osteochondroma, enchondroma, osteoid osteoma, osteoblastoma, chondroblastoma, chondromyxoid fibroma, and haemangioma.[26] Tumours can result in soft tissue swelling and localised enlargement of the extremity (osteosarcoma).[27] In advanced stages, tumour swelling may also cause skin changes, including prominent veins, striation, hyperthermia, and eventually ulceration.[27]

Clinical Features

The clinical presentation of children with ULE is varied and depends on the cause and extent of the enlargement (Figures 113.1–113.3). Commonly, there is an overgrowth (limb length discrepancy), which may impede function or be of cosmetic concern to the child and/or the parents. Overgrowth may be localised or diffuse, regular or irregular, rapidly or slowly progressive; it may or may not cause deformity.

Determining the underlying pathology causing ULE is vital for offering the correct management. Important factors for assessing aetiology include identifying the time of presentation (e.g., from birth or later in childhood) and whether the ULE is an isolated problem or part of broader

Figure 113.1: Vascular malformation of the right upper limb in a young boy.

Figure 113.2: Lipofibromatosis of the right lower limb in a young girl. Note the slight discrepancy in the diameter of the legs, and pedal macrodactyly of the medial 3 toes.

Figure 113.3: Plexiform neurofibroma of the left lower limb in a teenage girl. Note the hyperpigmentation. The dressing is covering a pressure ulcer.

syndrome. Specific clinical features are seen with the different causes.

In the early stages of lymphoedema, there is swelling that subsides with elevation, and pitting oedema is seen with peau d'orange skin changes. In later stages, tissue fibrosis develops, preventing pitting, and ultimately lymphostatic elephantiasis develops, combined with trophic skin changes such as acanthosis, fat deposits, and warty overgrowths.[8]

Childhood cases of lymphatic filariasis may be unrecognised because they may be clinically asymptomatic, with symptoms developing only after puberty. However, affected children may suffer with adenitis or lymphadenopathy, and (although uncommon under the age of 10 years) children have been reported to have the same chronic clinical manifestations as adults, including hydrocele, lymphoedema, and elephantiasis.[7]

Haemangiomas, neurofibromas, and other vascular anomalies could be associated with pigmentary changes of the overlying skin[1,17] (see

Figure 113.3). Complications of pain, ulceration, and bleeding may herald late presentation.[13] Most vascular malformations will empty on gentle pressure, as opposed to the case for haemangiomas and lipofibromatosis. Some children with complex vascular malformations could also present with features of high output cardiac failure.[1]

Osteomyelitis and bone tumours can present with clinical features relatively similar to ULE, the most common being bone pain followed by localised tissue swelling.[28] Children with osteomyelitis often show systemic signs of infection, including fever, malaise, and weight loss, with the infected area of bone likely to be sore, warm, and swollen. Most children with bone tumours are well systemically, although symptoms such as fever, weight loss, anorexia, and malaise can be present in advanced disease.[29] As with osteomyelitis, there may be the presence of a localised soft tissue mass with raised temperature that grows in size.[26]

Investigations

The choice of investigations carried out should be determined by the clinical history and features. Imaging techniques often have an important role in identifying the cause of ULE.[1,30] Although advanced, expensive radiological investigations may be required to obtain an accurate diagnosis, more basic tests also can be of significant use. As an example, the diagnosis of lymphatic filariasis had been extremely difficult because parasites had to be detected microscopically in the blood, and in most parts of the world, the parasites have a "nocturnal periodicity" that restricts their appearance in the blood to only the hours around midnight. However, there is now a very sensitive, very specific simple "card test" to detect circulating parasite antigens without the need for laboratory facilities and using only finger-prick blood droplets taken any time of the day.[31]

Radiography

Plain radiographs are used to assess any bone pathology and to document limb length discrepancies, which can be performed serially. Plain radiographs remain the mainstay for the initial evaluation of a primary bone tumour, providing information on the anatomical site of the lesion, the nature of the host bone in which the tumour has arisen, the presence of any mineralised matrix that may represent areas of calcification or ossification within the tumour, the nature of the interface between the tumour and the surrounding host bone, and the reaction of the host bone to the presence of the tumour.[26] Plain x-ray bone changes lag osteomyelitis by 10–20 days but include osteolysis, sequestra (islands of necrotic bone), and bone abscess (Brodie's abscess, pineda vargos), but earlier findings include soft tissue swelling and periosteal reaction.[32]

Ultrasonography

Ultrasonography (US) is an imaging modality with a wide application spectrum in the paediatric population due to its lack of ionising radiation.[26] US combined with Doppler imaging is an excellent tool to visualise the soft tissue and vascular structures of the limbs. It is able to determine the flow rate of the vascular lesions and differentiate one from another. Although haemangiomas can be characterised by fast flow as well, the history and age at onset should distinguish them from AVMs and other vascular malformations.[1] US may also be used to identify bone lesions and it has been demonstrated to be of use in diagnosing the early signs of osteomyelitis in children, identifying soft tissue abscesses or fluid collections, and identifying periosteal elevation.[32] US is also a useful tool in diagnosing lymphatic filariasis.[7]

Magnetic Resonance Imaging

Magnetic resonance imaging (MRI) is a particularly useful imaging modality in the assessment of ULE because it accurately visualises bone, soft tissue, and vascular structures without radiation exposure.[26] Indeed, MRI and MR angiography (MRA) are the most useful tools to demonstrate the full extent of vascular malformations.[33] MRI provides the foundation for describing the type and extent of each of the vascular malformation components. MRI can demonstrate fatty, muscular, and bony overgrowth, with generalised enlargement of the normal named arteries

and veins within the affected limb. MRI is also routinely used in the assessment of bone tumours to define the lesion and soft tissue reactions and is effective in the detection and surgical localisation of osteomyelitis.[34]

Diagnositic imaging is not usually helpful in the diagnosis of lymphoedema. MRI, however, might be useful to distinguish between lymphoedema, tissue overgrowth, or vascular malformation when there is a mixed clinical picture. Qualitative lymphoscintigraphy can also be helpful to understand whether swelling is (or is not) lymphatic in origin and, if so, what the mechanism might be. For example, Milroy disease shows no peripheral uptake of tracer as there due to an absence of initial lymphatics.[9]

Treatment

The treatment of unilateral limb enlargement requires a systematic approach. Generally, the goal is to treat the problem as conservatively as possible. Surgical intervention is usually reserved for advanced disease because it is often technically challenging, requiring meticulous dissections to preserve vital structures, and it frequently has a risk of severe complications. Surgery is required primarily for cosmetic purposes and to restore function. However, it may also be required to address the complications of ulceration, bleeding, and limb-length discrepancy.

Conservative Treatment

The cornerstones to the treatment of lymphoedema are compression therapy, manual lymph drainage, and exercise in order to reduce pitting oedema, encourage lymph flow transport, and maintain mobility, respectively. This includes elevation and compression stockings/bandaging, massage techniques to stimulate collateral lymph drainage, and encouragement of children to perform as many normal recreational activites as possible.[9] Most studies have not found significant improvement with the use of diuretics.[35]

Antiparasite treatment is necessary for patients with lymphatic filariasis. Both albendazole and diethylcarbamazine (DEC) have been shown to be effective in killing the adult-stage filarial parasites. This treatment in itself can result in improvements of lymphoedema symptoms. Conservative measures to improve lymphatic flow combined with rigorous hygiene to prevent bacterial and fungal "superinfection" of the affected tissues also play vital roles in prevention of disease progression and even clinical improvement.[36]

Most cases of haemangiomas are best handled by reassuring the parents because significant numbers will involute before the first decade of life. Antiangiogenic treatment for haemangiomas include oral, systemic, or intralesional steroids as first-line drugs and recombinant interferon alfa, 2a or 2b, as a second-line drug. The overall response rate following steroid or interferon treatment is 80–90%, but no synergism has been demonstrated when steroids and interferon are used simultaneously.[1] Live vaccines, such as polio, measles, rubella, mumps, and varicella, should be withheld while children are taking the steroids. Low-flow vascular malformations, especially venous and macrocystic lymphatic malformations, are effectively treated by percutaneous intralesional injection of sclerosant drugs such as ethanol and detergent sclerosant drugs. The commonly used agents include 95% ethanol, 1–3% sotradechol, doxycycline, and sodium tetradecyl sulphate, all of which produce scarring and collapse of the cysts.[37] Shoe lifts are recommended for children with lower limb length discrepancy if the discrepancy is greater than 1.5 cm at the age of 2 years.[1]

Osteomyelitis is primarily treated by using antibiotics, preferably or at least initially intravenously, generally given over a prolonged period of time ranging from 4 to 6 weeks.

Minimally Invasive Treatment

The use of lasers has not found much place in the management of limb enlargement, unlike the treatment of head and neck haemangiomas. Preoperative embolisation is used as part of a strategy for the management of AVMs. Angiographic embolisation facilitates the operation by decreasing bleeding, although this does not reduce the extent of tissues to be resected.[38] It is also useful in large and extensive vascular lesions that are not amenable to surgical treatment.

Surgical Treatment

Surgical treatment is indicated when conservative/minimally invasive methods are contraindicated or have failed, when there are complications, or for correction of significant lower limb length discrepancy. Surgical excisions of soft tissues aim to resect as much abnormal and excessive tissues as possible while making an effort to preserve vital structures. Staged contour resection/debulking can be used to treat areas of limb overgrowth and lymphoedema. Following some excisional surgeries, primary closure may not be possible without tissue-transfer techniques. Vacuum-assisted closure devices can also be useful in wounds with large soft tissue loss precluding linear closure.[1]

Surgical intervention for paediatric bone tumours depends upon the type of tumour, particularly whether it is benign or malignant. Depending upon the type of benign tumour, it may be simply observed or it may require curettage out of the bone, with bone grafting used to fill the debrided space. Malignant tumours require excision, which may be combined with preoperative chemotherapy. There is a growing use of limb-sparing surgery; however, there may be the need for amputation. Surgical intervention may also be required to treat osteomyelitis, including debridement and washout.

Occasionally, epiphysiodesis of the distal femoral growth plate could be performed at about the age of 12 years to correct overgrowth, but such a procedure for arm-length discrepancies is usually unnecessary. Amputation may be a last option in late presentation (see Figure 113.1) where the limb enlargement is massive (not amenable to resection/debulking) and limited to the distal extremity.

Intraoperative tips to avoid morbidity and mortality include the following:

1. Staged surgical approach is usually required.

2. Remove as much abnormal/excessive tissue as possible.

3. Avoid injury to vital structures by avoiding overzealous excision.

4. Limit blood loss to less than the patient's total blood volume.

5. Employ special tissue transfer techniques, when necessary, to close the wound.

Western Management

The underlying pathophysiology of ULE within the developed world is different from that of the developing world. The Western world has an increased incidence of congenital versus acquired causes, particularly with the absence of lymphatic filariasis and other secondary causes of lymphoedema. Generally, a multidisciplinary team approach is necessary to carefully assess the patient, sequentially evaluate limb inequalities, and formulate the appropriate management plan. Despite greater access to interventional radiology and advanced surgical techniques, treatment is still focused upon conservative measures unless severe symptoms or complications arise.

Prognosis

The outcome of unilateral limb enlargement depends on the cause of enlargement, the extent of the lesion, and the treatment that is available to the patient. The condition is essentially from benign causes, and malignant transformation is very rare. However, sarcomatous change can occur in a small percentage of patients. Those with chronic ulcerations may transform to Marjolin's ulcers. The recurrent rate after surgical intervention ranges from 15% to 40%. Death is usually from bleeding, infections, and high output cardiac failure.

Evidence-Based Research

Table 113.2 presents an extensive review of information available on lymphatic filariasis as well as problems still to be addressed.

Table 113.2: Evidence-based research.

Title	Lymphatic filariasis: an infection of childhood
Authors	Witt C, Ottesen EA
Institution	Lymphatic Filariasis Elimination, World Health Organisation, Geneva, Switzerland
Reference	Trop Med Inter Health 2001; 6(8):582–606
Problem	New, highly sensitive diagnostic tests have now revealed that lymphatic filariasis (LF) is first acquired in childhood, often with as many as one-third of children infected before age 5. Recognising that the disease starts its development in childhood has immediate practical implications both for its management and prevention in individual patients and for the broader public health efforts.
Intervention	This review aims to bring together in a comprehensive fashion much of the information already available on LF in children and to focus attention on those critical uncertainties that still need to be resolved.
Comparison/ control (quality of evidence)	A medline-based literature search covering the years 1966–2000 was carried out by exploring the identifier "filariasis" with the terms "child", "children", "paediatric", and `"adolescent". Retrieved articles were supplemented by bibliographic references from these articles and reports and documents published by the World Health Organization (WHO). Of all the publications assessed, 83 were selected for inclusion in this review because they met the following criteria: they were published either in peer-reviewed journals or in official government documents; they described age-delineated populations endemic for either *Wuchereria bancrofti* or *Brugia malayi* infection that had not been subjected to antimalarial measures during at least the previous 5 years; and they included a complete description of the relevant diagnostic methods used.
Outcome/ effect	Across all endemicity levels, the prevalence of LF infection in children is proportional to that of the adults in each population; those younger than 10 years of age have prevalence rates averaging 30% of the adult rate, and 10–19-year-olds have about 69% of the adult rate. The enhanced effectiveness of antigen detection, vis-à-vis microfilaria detection, to diagnose LF infection is greatest in very young children, many of whose infections had been previously undiagnosed. The new, recently codifed approaches to managing filarial lymphoedema and hydrocoele in adults have also been used successfully with children.
Historical significance/ comments	LF is a frequent and common infection of children in all LF-endemic areas. It causes both subclinical lymphatic damage and eventual overt clinical disease. It is critically important to learn how to reverse these early lesions and thereby prevent future development of lymphoedema and hydrocoele in older children and adults.

Key Summary Points

1. Unilateral limb enlargement is uncommon in day-to-day practice.

2. Unilateral limb enlargement has numerous aetiological factors.

3. A common presentation is for enlargement, limb length discrepancy, cosmesis, and complications.

4. Imaging techniques are the mainstay of investigations.

5. Staged contour resection is the mainstay of treatment.

6. The recurrence rate is between 15% and 40%.

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