

# Surgical treatment of craniofacial haemangioma in children

Kamal Abdel-Elah Aly

**Background/purpose** Infantile haemangiomas are the most common tumours of infancy, with an incidence of up to 12%. The craniofacial area is affected in 60% of cases, which represents a therapeutic challenge. The purpose of this study was to evaluate the indications, results and complications of early surgical management of craniofacial haemangiomas.

**Patients and methods** Twenty-eight patients with craniofacial haemangiomas (18 females and 10 males) were subjected to surgical treatment between 2006 and 2010. They were presented within the first 2 years of life. For each patient, the age, sex, site, indication of surgery and postoperative complications were recorded.

**Results** All patients in the study had a single lesion. Surgery consisted of complete, one-stage excision with primary closure (19 patients) or closure with local flaps (nine patients). Postoperative complications (25%)

included partial disruption (two patients), partial recurrence (two patients) and one case each of haematoma, partial skin necrosis and infection.

**Conclusion** Surgical treatment is the prime goal in cases of haemangioma obstructing vital functions and complicated haemangioma. Surgery offers a short-term period of treatment with good results. *Ann Pediatr Surg* 7:133–138 © 2011 Annals of Pediatric Surgery.

*Annals of Pediatric Surgery* 2011, 7:133–138

**Keywords:** craniofacial area, haemangioma, surgical treatment

Pediatric Surgery Unit, Faculty of Medicine, Mansoura University, Mansoura, Egypt

Correspondence to Kamal Abdel-Elah Aly, Pediatric Surgery Unit, Faculty of Medicine, Mansoura University, Mansoura, Egypt  
Tel: +02-0122447637; fax: +02 050 2234092; e-mail: kamalaly5@yahoo.com

Received 14 December 2010 accepted 12 June 2011

## Introduction

Infantile haemangiomas are the most common tumours of infancy, with an incidence of up to 12% by the end of the first year [1]. It is more frequent in females than in males, with a ratio of 3:1 [2]. It is usually a single lesion in 80% of the cases [3]. Haemangiomas are proliferating vascular neoplasms that have a proliferating phase, a stable phase and then resolve spontaneously. However, 20–40% of affected children are left with residual skin changes ranging from telangiectasia, hyperpigmentation, hypopigmentation or atrophic skin to fibrofatty residue or permanent deformation of the ears, eye lids, nose or lips [4–6]. The approach of wait and see is based on the natural course of these lesions [4]. However, many reports advocate early treatment [7–9].

The treatment of patients with extended vascular anomalies localized in the craniofacial area – present in 60% of cases – represents a clinical challenge that is best dealt with a multidisciplinary diagnostic and therapeutic concept [10].

Well-established treatments for haemangiomas include intralesional or systemic corticosteroids, IFN $\alpha$ , bleomycin A5, laser therapy, cryotherapy, systemic propranolol and surgical excision [11–16].

The classic indications for surgical resection of haemangioma include obstruction of the visual axis, large haemangioma with thrombocytopenia, obstruction of luminal structures, uncontrollable ulceration, haemorrhage, infection, cardio-pulmonary decompensation and small lesions that can be excised without a cosmetic or a functional risk [17]. The aim of this study was to evaluate the indications and outcome of early surgical treatment of craniofacial haemangioma.

## Patients and methods

In this study, information from the case notes of 28 patients with craniofacial haemangiomas subjected to surgical treatment between January 2006 and September 2010 was collected.

The patients (18 females and 10 males) presented within the first 2 years of life (mean age 15.6 months).

Early curative surgery was applied for nasal tip haemangioma that caused cartilage distortion, labial haemangioma that affected eating, haemangioma that obstructed the visual field, haemangioma causing hyperdynamic circulation, complicated haemangioma (ulceration, infection, haemorrhage) and haemangioma posing a psychosocial burden for the parents.

Excision of haemangioma was followed by primary closure of the wound or closure with local flaps.

Patients with extensive haemangiomas involving a large area of the craniofacial region were excluded from the study (Figs 1 and 2).

## Results

Twenty-eight patients under 2 years of age were subjected to a surgical treatment of craniofacial haemangiomas (mean age 15.6 months) (Table 1).

Before surgical treatment, five patients were treated by an intralesional corticosteroid injection one to three times and another group of patients (three patients) were treated by an intralesional injection of sclerosant (the two groups were injected elsewhere). Both groups did not show involution of the lesions. Moreover, one patient of the sclerosant group showed deep ulceration (Fig. 8a and b); a local steroid injection was administered in five

Fig. 1



Extensive craniofacial haemangioma.

Fig. 2



Child with the PHACES syndrome.

patients, which caused skin thinning with underlying fat necrosis in three patients. Oral prednisolone at a dose of 2–3 mg/kg/day was administered in six patients (4–6 weeks) to speed up involution of the lesions before surgical resection.

Early curative surgery was performed for (Table 2) eight patients with lip haemangioma (six upper lip, two lower lip) (Figs 3a, b and 4a, b). Two patients underwent surgical excision of nasal tip haemangioma. Among patients with visual obstruction, surgery was performed for two patients (Figs 5a, b and 6a, b). One patient with a large occipital haemangioma underwent excision with primary skin closure (Fig. 7a and b). Early surgery was performed in five patients with cheek haemangiomas

Table 1 Age distribution of the studied group

Age (months)	No. (%)
6–12	8 (28.6)
13–18	11 (39.3)
19–24	9 (32.1)

Table 2 The site of the lesion

Site	No. (%)
Lip	8 (28.6)
Nasal tip	2 (7.1)
Occipital	1 (3.6)
Cheek	5 (17.8)
External ear	2 (7.1)
Frontal	4 (14.3)
Retroauricular	2 (7.1)
Temporal	1 (3.6)
Angle of mandible	1 (3.6)
Glabella	1 (3.6)
Upper eye lid	1 (3.6)

(Figs 8a, b and 9a, b), two patients with external ear haemangioma, four patients with frontal haemangioma, two patients with retroauricular haemangioma, one patient with haemangioma of the temporal region and one patient with haemangioma at the angle of the mandible.

The indications for surgery are summarized in Table 3. Patients who were presented with inflammation, infection or ulceration were prepared with systemic and local antibiotics; however, haemodynamic stability was not affected in patients who were presented with repeated haemorrhage.

As regards postoperative complications (25%) (Table 4), two patients with upper lip haemangioma showed partial disruption of the mucosal aspect on the eighth and 10th postoperative days (treated conservatively); partial necrosis of the skin flap had occurred in one patients with cheek haemangioma and healed with secondary intention. Infection had occurred in a patient with large scalp haemangioma (treated with systemic and local antibiotics), whereas one patient with retroauricular haemangioma showed haematoma formation (evacuated surgically).

Partial recurrence occurred in two patients (upper lip and cheek) 3 and 5 months postoperatively and was treated with a sclerosant injection.

## Discussion

Haemangiomas represent true tumours with rapidly proliferating endothelial cells and capillary lumina. In contrast, vascular malformations have a normal cell turnover and dilated mature vascular structures that persist throughout life [18].

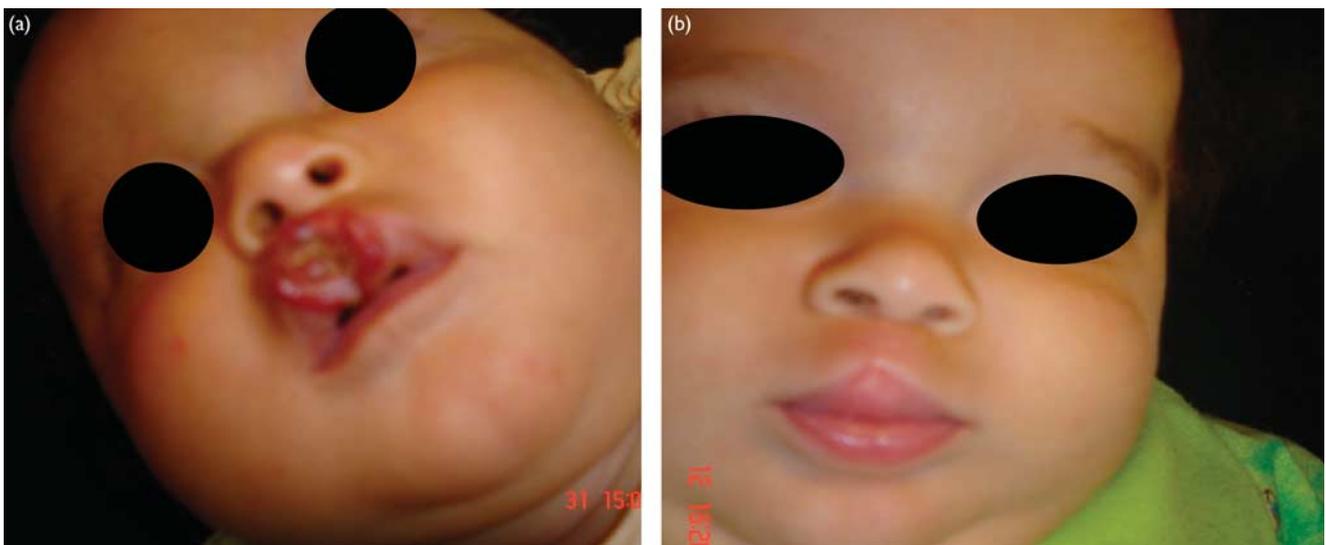
About 50% of haemangiomas regress spontaneously without after effects, which justifies not treating them; progress in the other 50% of cases may be less favourable [19]. Moreover, some haemangiomas not only fail to involute but also progress further, inducing deformities that may interfere with organ function [15]. In our series, 28 patients were subjected to surgical

Fig. 3



(a) Huge upper lip haemangioma. (b) Immediate postoperative view.

Fig. 4



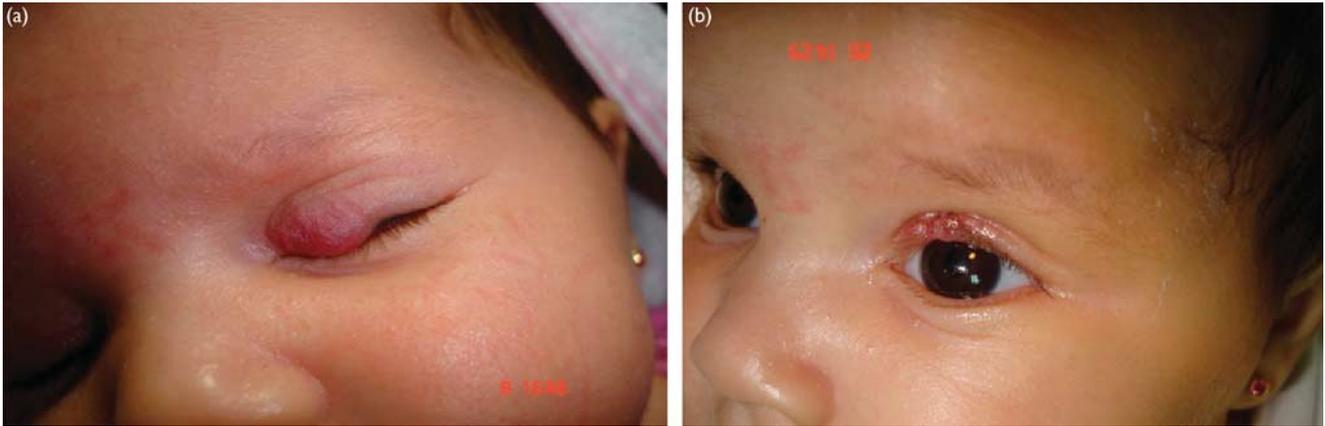
(a) Ulcerating upper lip haemangioma. (b) Postoperative view (6 months after operation).

treatment because of complications (11 patients, 39.3%), interference with vital functions (five patients, 17.8%), haemangioma in areas prone to wear and tear (one patient, 3.6%) and aesthetic surgery for patients causing psychological troubles for the parents (11 cases, 39.3%). As regards the aesthetic group, surgery was performed during the last 8 months of the second year of life, which is in contrast to patients presenting with complications, most of whom were operated during the first year.

Iyer and Gough [19] stated that conservative treatment for haemangioma is recommended, as resolution usually occurs within first 6 years of life and surgery is reserved

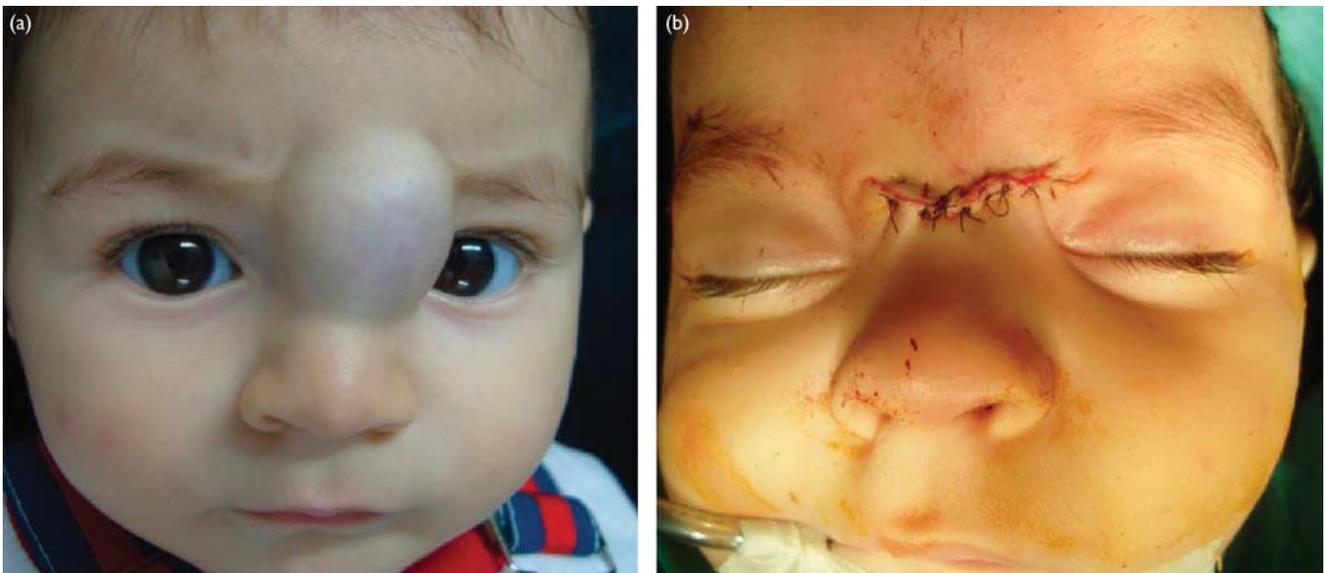
for complications. In contrast, Van der Horst *et al.* [20] concluded that after involution, only 6% of haemangiomas had disappeared leaving normal skin. Also, Hoornweg *et al.* [21], through their work on health-related quality of life of haemangiomas for children and parents, believed that having a haemangioma, especially if complicated or in a visible location, could result in psychological problems later in life, mostly related to physical appearance, which justifies early treatment. In agreement with this and to alleviate the psychological stress caused by haemangiomas for the family, 39.3% of our patients were operated upon; we found that the parents were satisfied with the postoperative cosmetic outcome.

Fig. 5



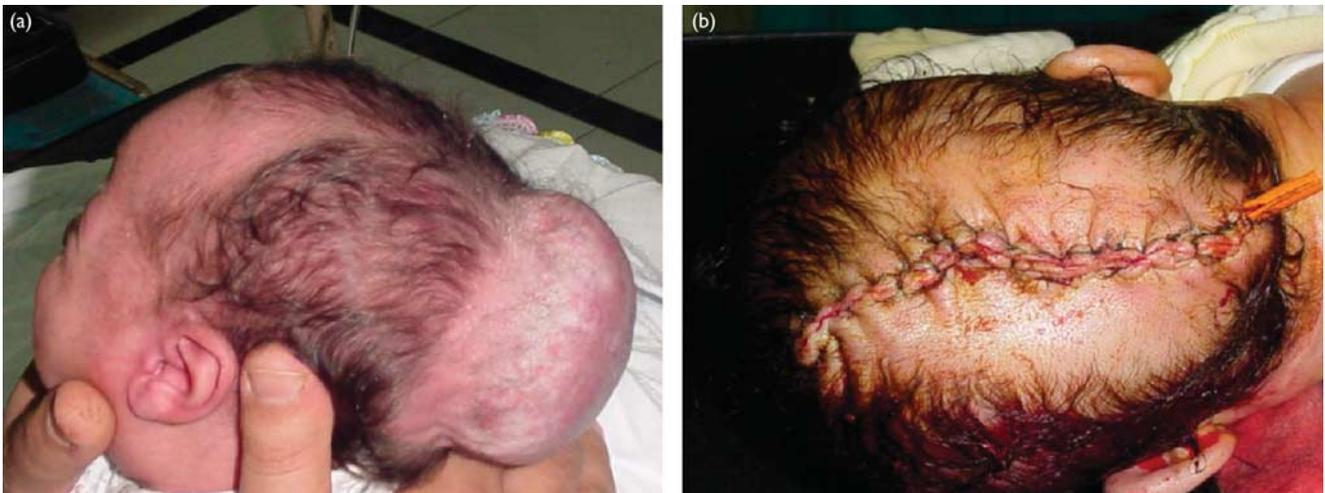
(a) Upper eye lid haemangioma. (b) Postoperative view (1 week after operation).

Fig. 6



(a) Glabellar haemangioma. (b) Immediate postoperative view.

Fig. 7



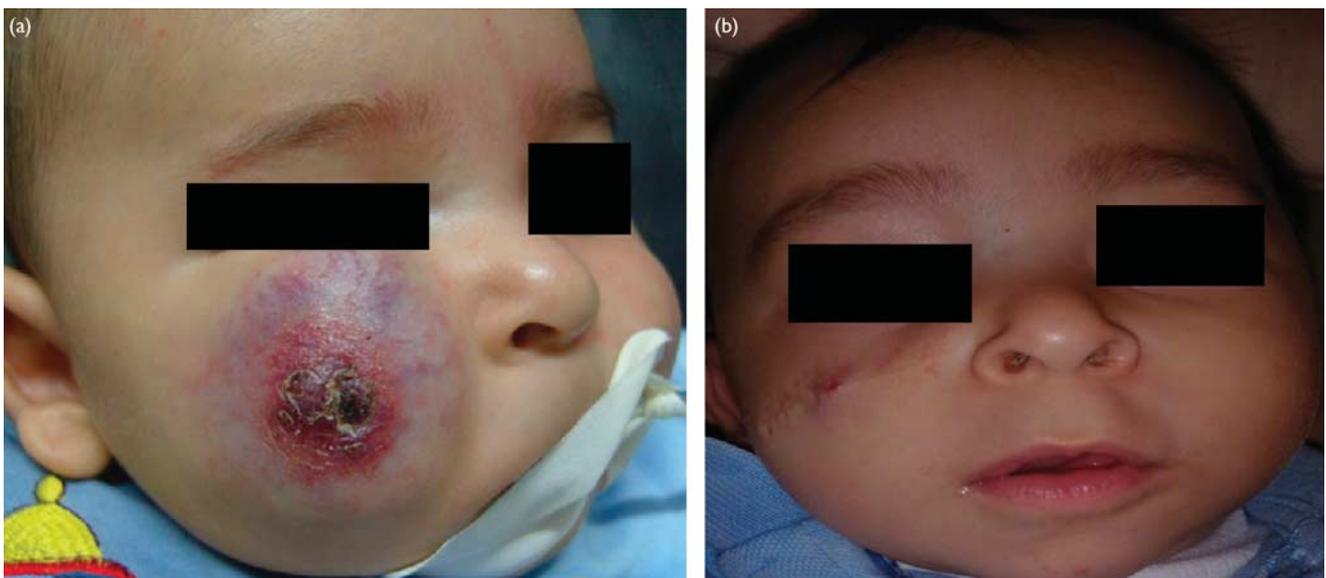
(a) Huge scalp haemangioma. (b) Immediate postoperative view.

Fig. 8



(a) Ulcerating cheek haemangioma. (b) Immediate postoperative view.

Fig. 9



(a) Inflamed cheek haemangioma. (b) Postoperative view (3 months after operation).

Table 3 Indications for surgery

Indications	No. (%)
Aesthetic	11 (39.3)
Ulceration	5 (17.9)
Difficult suckling	3 (10.7)
Visual field obstruction	2 (7.1)
Inflammation and infection	4 (14.3)
Haemorrhage	2 (7.1)
Hyperdynamic circulation	1 (3.6)

Long-term medical treatments for haemangiomas may markedly affect body system functions, for example steroid therapy, which may induce cushing syndrome,

Table 4 Postoperative complications

Complications	Site	No. (%)
Partial disruption	Lip	2 (7.2)
Skin flap necrosis	Cheek	1 (3.6)
Infection	Scalp	1 (3.6)
Haematoma	Retroauricular	1 (3.6)
Partial recurrence	Cheek-upper lip	2 (7.2)

delayed wound healing and immunosuppression [23].  $IFN\alpha$  is associated with spastic diplegia, neutropenia and liver enzyme abnormalities. Propranolol causes bradycardia, hypotension, bronchospasm and hypoglycaemia [24]. The side effects of bleomycin include painful swelling,

ulceration, shock and pneumonic fibrosis [15]. Six patients in our series were treated with oral prednisolone for 4–6 weeks before surgery in another hospital. The parents in this group observed an increase in weight and appetite in their children, without an appreciable effect on the haemangioma.

The questionable role of an intralesional injection of haemangioma needs to be discussed. In the group studied, five patients were injected with steroids, whereas three patients were injected with a sclerosing agent. (Both groups were injected elsewhere at the age of 6–14 months.) Three patients of the first group showed complications of thinning of the skin with underlying fat necrosis, whereas one patient of the second group developed deep ulceration.

In accordance with McHeik *et al.* [18] and Watanabe *et al.* [24], we found that an early surgical intervention required for complications and haemangiomas affecting vital functions yields good results especially in craniofacial regions. Also, we found that the outcome after excision of localized craniofacial haemangioma was satisfactory, especially if causing psychosocial embarrassment. The same observation was reported by Achauer *et al.* [25] and Demiri *et al.* [26].

Despite the relatively high rate of complications in our series (25%), we found that most of them were mild and were treated conservatively, even for the two patients who showed partial recurrence. The recurrence occurred at the periphery of the scar 3 and 5 months after an operation and was treated with a sclerosant injection.

In the present series, we found different degrees of concern from most of the parents about the facies of their children. In reality, this, together with the lack of compliance on the part of the parents in terms of the lengthy nonoperative treatment of haemangioma, were the factors that led to the initiation of this work.

## Conclusion

Surgical treatment is the prime goal in cases of haemangioma affecting vital organs like the upper eye lid, nares or areas close to the external auditory canal, haemangiomas in areas prone to wear and tear before ulceration or haemorrhage like the lips, forehead and neap regions and complicated haemangioma or haemangioma causing psychological disturbances. Excisional surgery for craniofacial haemangioma – when indicated – represents a short-term therapy with good results in this early age group.

## Acknowledgements

### Conflicts of interest

There are no conflicts of interest.

## References

- Esterly NB. Cutaneous hemangiomas, vascular stains and malformations and associated syndromes. *Curr Probl Pediatr* 1996; **26**:3–39.
- Graham JM, Scadding GK, Bull PD. *Pediatric ENT*. 2008; Springer.
- Fishman SJ, Mulliken JB. Hemangiomas and vascular malformations of infancy and childhood. *Pediatr Clin North Am* 1993; **40**: 1177–1200.
- Enjolras O, Mulliken JB. The current management of vascular birthmarks. *Pediatr Dermatol* 1993; **10**:311–313.
- Enjolras O. Classification and management of the various superficial vascular anomalies: hemangiomas and vascular malformations. *J Dermatol* 1997; **24**:701–710.
- Panda N, Ghosh D, Gumta M, Das R. Managing parotid haemangioma in a rural set up: a case report. *Jurnalul Chirurgie* 2010; **6**:356–360.
- Muir T, Kirsten M, Fourie P, Dippenaar N, Ionescu GO. Intralesional bleomycin injection (IBI) treatment for haemangiomas and congenital vascular malformations. *Pediatr Surg Int* 2004; **19**:766–773.
- Omidvari S, Nezakatgoo N, Ahmaddoo N, Mohammadianpanah M, Mosalaei A. Role of intralesional bleomycin in the treatment of complicated hemangiomas: prospective clinical study. *Dermatol Surg* 2005; **31**:499–501.
- Pienaar C, Graham R, Geldenhuys S, Hudson DA. Intralesional bleomycin for the treatment of hemangiomas. *Plast Reconstr Surg* 2006; **117**:221–226.
- Ernemann U, Kramer U, Miller S, Bisdas S, Rebmann H, Breuninger H, *et al.* Current concepts in the classification, diagnosis and treatment of vascular anomalies. *Eur J Radiol* 2010; **75**:2–11.
- Al Sebeih K, Manoukian J. Systemic steroids for the management of obstructive subglottic hemangioma. *J Otolaryngol* 2000; **29**: 361–366.
- Poetke M, Philipp CM, Urban P, Berlien HP. Laser therapy of haemangiomas and vascular malformations – techniques and strategies. *Med Laser Appl* 2004; **19**:32–44.
- Vesnaver A, Dovšak DA. Treatment of large vascular lesions in the orofacial region with the Nd:YAG laser. *J Craniomaxillofac Surg* 2009; **37**: 191–195.
- Luo Q, Zhao F. How to use bleomycin A5 for infantile maxillofacial haemangiomas: clinical evaluation of 82 consecutive cases. *J Craniomaxillofac Surg* 2010 [In press].
- Léauté Labrèze C, De La Roque ED, Hubiche T, Boralevi F, Thambo JB, Taïeb A. Propranolol for severe hemangiomas of infancy. *N Engl J Med* 2008; **358**:2649–2651.
- Watzinger F, Gossweiner S, Wagner A, Richling B, Millesi Schobel G, Hollmann K. Extensive facial vascular malformations and haemangiomas: a review of the literature and case reports. *J Craniomaxillofac Surg* 1997; **25**:335–343.
- Lever WF, Schaumburg Lever G. *Histopathology of the skin*. 1990 Philadelphia: Lippincott Company.
- McHeik JN, Renauld V, Duport G, Vergnes P, Levard G. Surgical treatment of haemangioma in infants. *Br J Plast Surg* 2005; **58**:1067–1072.
- Iyer KR, Gough DCS. Conservative management of parotid haemangiomas. *Pediatr Surg Int* 1995; **10** (5–6):374–375.
- Van der Horst CMAM, Koster PH, Lucassen GW. Laser options for vascular lesions in children. *Pediatr Dermatol* 1996; **11**:301–303.
- Hoorweg MJ, Grootenhuis MA, Van der Horst CMAM. Health-related quality of life and impact of haemangiomas on children and their parents. *J Plast Reconstr Aesthet Surg* 2009; **62**:1265–1271.
- George ME, Sharma V, Jacobson J, Simon S, Nopper AJ. Adverse effects of systemic glucocorticosteroid therapy in infants with hemangiomas. *Arch Dermatol* 2004; **140**:963–969.
- Siegfried EC, Keenan WJ, Al Jureidini S. More on propranolol for hemangiomas of infancy. *N Engl J Med* 2008; **359**:2846–2847.
- Watanabe S, Takagi S, Sato Y, Hosaka Y. Early surgical intervention for Japanese children with infantile hemangioma of the craniofacial region. *J Craniomaxillofac Surg* 2009; **20** (Suppl 1):707–709.
- Achauer BM, Chang CJ, Vander Kam VM. Management of hemangioma of infancy: review of 245 patients. *Plast Reconstr Surg* 1997; **99**: 1301–1308.
- Demiri EC, Pelissier P, Genin Etcheberry T, Tsakoniatis N, Martin D, Baudet J. Treatment of facial haemangiomas: the present status of surgery. *Br J Plast Surg* 2001; **54**:665–674.