Let’s face it – 13 unusual causes of facial masses in children

Jacqueline du Toit1 · Nicole Wieselthaler1

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Abstract
Facial swelling is commonly encountered in paediatric patients and is typically related to an underlying infection. The spectrum of possible causes, however, is wide, and includes traumatic, inflammatory, nutritional and neoplastic aetiologies. In this pictorial essay we present 13 examples of rare conditions selected from a total of 136 MRI examinations performed at our institution between April 2007 and May 2013. These include HIV-associated malignancies such as a case of plasmablastic lymphoma, parotid gland tumours including a parotid hamartoma, rare congenital lesions such as a thyroid fetiform teratoma, and infective lesions including tuberculosis of the mandible. In many cases, only minimal information could be gleaned from the literature, particularly with regard to imaging findings. An analysis of the spectrum of masses and specific clinical presentations allowed for the construction of a diagnostic flow-chart which may serve to assist in unusual cases.

Teaching Points
• Facial swelling is commonly encountered in paediatrics, with a wide spectrum of possible aetiologies.
• MRI is the favoured imaging modality for accurate assessment.

Facial swelling is typically infectious in nature, but includes various benign and malignant causes.
• This pictorial essay presents 13 examples of rare conditions with corresponding imaging.

Keywords Facial neoplasm · Paediatric · Magnetic resonance imaging · Tumour-like · HIV

Introduction
Facial swelling is a common clinical scenario in the paediatric setting, associated with a diverse range of possible causes. The underlying aetiology ranges from congenital lesions to infective and inflammatory conditions, and various other benign or malignant masses [1].

Advances in imaging techniques have led to the ever-increasing use of computed tomography (CT) and magnetic resonance imaging (MRI) for evaluating the extent of disease and for treatment planning [1].

In the case of facial swelling associated with a systemic illness, poor response to antibiotic treatment, or a clinical suspicion of malignancy, cross-sectional imaging should be considered [2].

At our institution, MRI is favoured for the assessment of paediatric facial masses, with the advantages of superior soft tissue resolution and a lack of ionizing radiation.

There are several key clinical features that should be taken into account when interpreting this type of imaging, including the age of the child, the location of the mass, the duration and nature of onset, and any underlying condition associated with the development of neoplasms [3].

The most commonly encountered facial masses in the paediatric population are infective in nature, typically
due to lymphadenitis, sinusitis, or a dental infection [1, 2].

Congenital masses tend to be non-progressive; examples include fronto-ethmoidal cephaloceles, nasal gliomas, and nasal dermoid and epidermoid cysts [1, 2].

Rapidly progressive masses include malignancies, with rhabdomyosarcoma and lymphoma being the most common, in addition to osteogenic sarcoma, Langerhans cell histiocytosis (LCH), Ewing’s sarcoma, and metastatic neuroblastoma [1, 4].

Although several reviews of the common causes of facial masses can be found in the literature, there is relatively little on the spectrum of more unusual causes such as salivary gland tumours and teratomas [4].

Our series includes 13 examples of rare, biopsy-proven conditions (Table 1), selected from a total of 136 MRIs of children presenting with facial masses between April 2007 and May 2013. These include two HIV-associated malignancies, three parotid gland tumours, two congenital facial masses, two lesions of the mandible, a paranasal sinus tumour, and three additional unusual facial malignancies. A literature review has been conducted, although in many instances the information available is scant.

A careful analysis of the various tumours and tumour-like lesions, as well as their clinical presentations, assisted in the design of a diagnostic flowchart (Table 2). Lesions present for 3 months or less were predominantly malignant tumours, but also included congenital and infectious causes. Those with a presence longer than 3 months were all benign, barring the malignant yolk sac tumour with rhabdoid elements, which was extremely advanced at presentation, and may therefore have been present for longer than the patient history suggested. The more ill-defined, destructive and invasive lesions tended to fall into the group of malignant tumours and infectious lesions, while the benign lesions tended to be well-circumscribed. The congenital lesions comprised both benign and malignant aetiologies and thus exhibited variable imaging characteristics.

**Congenital lesions**

**Fetiform teratoma**

Fetiform teratoma is a rare form of highly developed cystic teratoma which resembles a malformed fetus. Only very few cases have been reported in the literature, most presenting as ovarian masses in women of reproductive age [5, 6]. The reported age range, however, does span the neonatal period to age 65 [5]. No previously described case of a facial fetiform teratoma could be identified in the literature.

Although fetiform teratomas develop a high degree of differentiation and organisation, they do not typically contain complex, well-developed organ systems [6].

The tumour must be distinguished from fetus-in-fetu, which results from the inclusion of a monochorionic diamniotic twin within its host twin [7]. Diagnosis of fetus-in-fetu requires the presence of a highly developed and segmented axial skeleton, as well as organogenesis [8].

The degree of development and organisation can vary, however, blurring the distinction between the two entities, and it has been suggested that a continuum may exist [8].

MRI signal characteristics have been described as heterogeneous, with central areas of T2 hypointensity consistent with developed bony components, and adjacent hyperintensity representing fat and soft tissue components [5].

In our case, the child presented with a swelling over the right mandible at birth and associated stridor requiring tracheostomy.

MRI performed at 1 month of age showed a well-defined solid mass medial to the ramus of the mandible on the right. There were small hypointense foci on T2-weighted imaging, and the mass enhanced poorly post-contrast (Fig. 1).

**Congenital rhabdomyosarcoma**

Rhabdomyosarcoma (RMS) is an aggressive malignant soft tissue neoplasm of skeletal muscle origin which accounts for up to 8 % of all malignancies in children under 15 years of age. Neonatal presentation of this tumour, however, is rare [9].

A large cohort analysed by the IRS group showed that only 0.4 % presented before the age of 1 month [9].

The diagnosis of congenital RMS suggests the possible intrauterine development of this tumour, and the head, neck, and trunk are the most commonly affected sites [9].

On MRI, the tumours are typically hypointense to skeletal muscle on T1-weighted (T1-W) and hyperintense on T2-weighted (T2-W) imaging, enhance heterogeneously post-contrast, and demonstrate prominent vascularity [10].

Our MRI, performed when the baby was 5 days old, showed a 10 × 10.5 cm heterogeneous mass centred within the left parapharyngeal soft tissues. The tumour extended from the middle cranial fossa to the level of C4 inferiorly. There was associated destruction of the ramus of the left mandible and left lateral orbital wall.
| Patient | Age/Sex | Presentation                                                                 | Management                      | Histological diagnosis              | HIV status | Outcome                    |
|---------|---------|------------------------------------------------------------------------------|---------------------------------|-------------------------------------|------------|----------------------------|
| 1       | Newborn, F | Swelling over mandible at birth with associated stridor requiring tracheostomy | Surgical excision               | Congenital thyroid fetiform teratoma | Unknown    | Discharged                 |
| 2       | Newborn, F | Right facial mass at birth                                                   | Oncology                        | Congenital embryonal RMS            | Unknown    | Died aged 9 m              |
| 3       | 2y 7 m, F  | Facial swelling left parotid region since birth                               | Surgical excision               | Parotid hamartoma                   | Negative   | Recurrence                 |
| 4       | 3y 5 m, F  | Parotid swelling increasing in size since surgery                             | Bleomycin injection             | Recurrence                          | Negative   | Stable                     |
| 5       | 7y 6 m, F  | Right parotid swelling for 10 days                                           | Abscess incision and drainage   | Culture-confirmed TB mandible       | Negative   | Discharged upon completion of Rx |
| 6       | 1y 6 m, F  | Facial swelling left parotid region for 1 year                                | Surgical excision               | Pilomatrixoma                       | Unknown    | Discharged                 |
| 7       | 10y 3 m, F | Swelling over central mandible for 1 year                                     | Surgical excision               | Giant cell granuloma                | Unknown    | Discharged                 |
| 8       | 10y 8 m, F | Right facial swelling for 9 months                                           | Patient elected return to local hospital for management | Maxillary schwannoma                | Unknown    | Uncertain                  |
| 9       | 4 m, F    | Left cheek swelling since 3 weeks of age                                     | Surgical excision               | Infantile fibrosarcoma              | Negative (HIV exposed) | Oncology follow-up        |
| 10      | 4y 3 m, M | Right facial swelling for 1 month                                            | Oncology                        | Parameningeal RMS                   | Unknown    | Died aged 5y 4 m           |
| 11      | 1y 8 m, M | Left facial mass for 8 months                                                | Oncology                        | Composite yolk sac and rhabdoid tumour | Unknown    | Died aged 2y 1 m           |
| 12      | 11y 1 m, M| Generalised facial swelling for 1 month                                      | Oncology, antiretrovirals       | Plasmablastic lymphoma              | Positive   | Oncology follow-up         |
| 13      | 3y 8 m, M | Left jaw mass for 2 days                                                      | Oncology, antiretrovirals       | Burkitt lymphoma                    | Positive   | Oncology/Infectious Diseases follow-up |
| 14      | 7y 1 m, F | Marasmic left parotid mass for 2 months                                      | Oncology, antiretrovirals       | Mucoepidermoid carcinoma            | Positive   | Oncology follow-up         |
On the post-contrast images, there was avid enhancement with a large area of necrosis centrally (Fig. 2).

Parotid hamartoma

Hamartomas of the parotid gland are exceedingly rare, with only four cases having been described in the English language literature [11].

These benign tumour-like lesions arise during the development phase of an organ or tissue, and consist of a disorganized growth of differentiated mature tissues indigenous to that particular anatomic location [11].

No description of imaging findings of this rare lesion could be located in the literature.

In our example, the left parotid gland was expanded and almost entirely replaced by an avidly enhancing, heterogeneous mixed solid and cystic lesion (Fig. 3).
Infectious lesions

TB mandible

Tuberculosis (TB) is a chronic granulomatous disease caused by Mycobacterium tuberculosis. Although the chest is most frequently affected, any organ system may be involved, particularly in immunocompromised individuals [12].

Musculoskeletal tuberculosis, however, accounts for only 1–3% of cases [12], with TB of the mandible being rare and constituting only 2% of these [13].

Radiologically, tuberculous osteomyelitis typically appears as a unilocular destructive bone lesion with an associated periosteal reaction [14].

Our MRI showed a destructive bone lesion of the right mandible involving the ramus and coracoid process, with a periosteal reaction and associated heterogeneously enhancing soft tissue mass. Characteristic of TB were large bilateral carotid space nodes which were predominantly T2 hypointense, with rim enhancement and central necrosis (Fig. 4).

Benign tumours

Pilomatricoma

Pilomatricoma is a benign skin neoplasm derived from hair follicle matrix cells [15] and is commonly misdiagnosed, with imaging features that are not well understood [16].

Clinically, pilomatricomas often present as a solitary, superficial, rock-hard mass—a pathognomonic feature—with the overlying skin occasionally demonstrating a bluish discoloration [15, 17]. Although pain and secondary infection may occur, the majority of lesions tend to be asymptomatic, as was the case in this example.
Pilomatricomas occur most commonly in the first and second decades of life, predominantly in female patients—as was our patient [15].

Despite a lack of agreement regarding imaging features, pilomatricoma has been described as having a uniform intermediate signal on T1, heterogeneous signal on T2, and internal reticulations on contrast-enhanced T1-W images corresponding to oedematous stroma [16]. Peripheral enhancement has also been described [16].
Our MRI showed a $23 \times 12$ mm T1 and T2 hypointense subcutaneous nodule, with a well-defined T2 hyperintense rim. On the post-contrast images, there was both rim enhancement and diffuse reticular enhancement centrally (Fig. 5).

**Central giant cell granuloma**

Central giant cell granulomas (CGCGs) have been described as uncommon benign bone lesions, typically affecting the mandible and maxilla [18]. There is considerable controversy regarding the exact aetiology, which may be that of a reactive lesion following an episode of intraosseous haemorrhage or inflammation, or alternatively, a true neoplasm related to giant cell tumours [18, 19].

There is a wide age range affected, but the majority occur in patients younger than 30 years, and there is a 2:1 female pre-dilection [19]. Our female patient presented at age 10 years.

The lesions exhibit a wide spectrum of clinical behaviour, ranging from a painless, slowly-progressive swelling, to a larger, locally-destructive ‘aggressive’ lesion with a higher rate of recurrence following excision and curettage [18].

Similarly, there is considerable variation in the imaging findings. The spectrum ranges from a small unilocular lesion, to a much larger lesion with ill-defined margins, multiple loculations, and associated tooth displacement or root resorption [18].

Our imaging revealed a well-corticated, multi-cystic, expansile mandibular lesion, with solid components which enhanced avidly post-contrast (Fig. 6).

**Maxillary schwannoma**

A schwannoma (neurilemmoma) is a benign, slow-growing, encapsulated perineural tumour arising from nerve sheath Schwann cells [20].

Schwannomas occurring in the head and neck region are not unusual, but those originating in the maxillary sinuses are rare, with only seven cases to date having been reported in the literature [1, 21].
No case occurring in a child could be found in the literature, with the youngest reported case in a patient 17 years of age [1].

Clinically, the lesions are typically asymptomatic, but may present with pain, an enlarging mass, or proptosis [1], as was the case in this example.

No description of typical MRI features could be found.

Our case demonstrated a lesion with heterogeneous hypointense signal on T2, implying high cellularity. The mass was iso-intense to grey matter on T1 and enhanced post-contrast (Fig. 7).

Malignant tumours

Infantile fibrosarcoma

Infantile fibrosarcoma is a rare soft tissue neoplasm diagnosed at birth or soon afterwards.

These tumours typically affect the distal extremities, with only 16 % occurring in the head and neck region [22], and are often clinically misdiagnosed as hemangiomas [23].

The lesions may become disproportionately large relative to the size of the child, and tumours as large as 30 cm have been reported [22].

On MRI there is typically a heterogeneously enhancing soft tissue mass containing focal areas of hypo-enhancement due to haemorrhage or necrosis [22].

In our example, MRI showed a left subcutaneous masticator space lesion which was avidly enhancing and contained foci of low signal consistent with central necrosis.

There were no significant intrallesional flow voids to suggest a vascular malformation (Fig. 8).

Parameningeal rhabdomyosarcoma

Rhabdomyosarcomas (RMSs)—which originate from primitive mesenchymal tissue—contribute between 3 and 5 % of
childhood malignancies [24]. The region most commonly affected is the head and neck, accounting for approximately 35% of cases. This is followed by the genitourinary tract and the extremities [9].

Based on their location in the head and neck region, they may be classified as 1) orbital, 2) parameningeal, or 3) non-orbital-non parameningeal [9]. The parameningeal sites include the pterygopalatine and infratemporal fossae, paranasal sinuses, middle ear, and mastoid. These tumours have a tendency toward local and intracranial extension [24].

The clinical and biological behaviour of RMSs varies widely with their appearance, ranging from a small cutaneous

Fig. 9 Parameningeal rhabdomyosarcoma. Coronal T2-W (a) and axial T1-W (b) images show a 12×10 cm lobulated, heterogeneously enhancing (c) right facial mass extending from the base of skull to the inferior margin of the mandible, with invasion of the infratemporal fossa and destruction of the right globe

Fig. 10 Yolk sac tumour with rhabdoid elements. Coronal T2-W (a) and axial T1-W (b) MRI show a large well-circumscribed left cervical mass centered in the parapharyngeal space, extending from the skull base to the level of the thoracic inlet, with associated right cervical adenopathy. The mass is predominantly hyperintense on T2-W imaging (a) and demonstrates heterogenous post-contrast enhancement (c).

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facial nodule to an extensive rapidly progressive facial swelling [9], as was the case with our patient.

Our patient, a 4-year-old child, presented with an apparent history of progressive facial swelling over the previous month. On examination, there was a massive right-sided exophytic tumour with a destroyed right eye.

MRI showed a 12×10 cm aggressive lobulated heterogeneous right facial mass extending from the base of the skull to the inferior margin of the mandible, with invasion of the infratemporal fossa and destruction of the right globe (Fig. 9).

Yolk sac tumour with rhabdoid elements

Yolk sac tumours (YSTs) are malignant neoplasms of germ cell origin, usually occurring in the ovary or testes. Extragonadal YSTs are uncommon and most often seen in the sacrococcygeal, mediastinal, intracranial, and retroperitoneal regions. Extracranial head and neck YSTs are exceedingly rare [25].

YSTs primarily affect neonates and infants, and often occur in conjunction with other germ cell tumours, most commonly teratomas [26]. In the head and neck, extracranial YSTs may involve the orbit, maxillary sinus, retroauricular region, oral cavity, nasopharynx, submandibular gland, and parotid gland [26].

YSTs tend to be very aggressive and have early metastatic potential, usually involving the lungs, lymph nodes, liver, and bones [26].

MRI features have been described as a well-defined hyperintense tumour [25].

In our case, MRI revealed a large well-circumscribed left cervical mass centred in the parapharyngeal space, extending from the skull base to the level of the thoracic inlet, with associated right cervical adenopathy. The mass was predominantly hyperintense on T2 and demonstrated heterogeneous post-contrast enhancement (Fig. 10).
Malignant tumours in HIV

Plasmablastic lymphoma

Plasmablastic lymphoma (PBL) has been classified by the WHO as a new clinical entity, and characterised as an aggressive, invariably fatal, subtype of non-Hodgkin’s lymphoma, typically occurring in HIV-infected patients [27, 28]. Epstein–Barr virus and Kaposi sarcoma-associated human herpesvirus-8 are also thought to play a role in the pathogenesis of PBL [27].

PBL is a rare phenomenon in children, with only 10 cases reported in the literature [29–31]. Our case is that of an 11-year-old HIV-infected boy.

Although originally described as a disease arising in the oral cavity of immune-deficient patients, subsequent cases involving extraoral sites such as the maxillary sinus, nasopharynx, lung, skin, anus, and spermatic cord have been reported [27].

A description of the typical imaging features could not be found in the literature. Our MRI showed multiple bilateral lobulated facial masses which were T2 hypointense with multi-septated rim enhancement.

Mortality at 1 year is said to be approximately 60 %, although the combination of highly active antiretroviral therapy (HAART) and chemotherapy may significantly improve the prognosis [27]. At the time of publication, our patient was alive and undergoing oncology follow-up (Fig. 11).

Burkitt lymphoma

Burkitt lymphoma—an undifferentiated non-Hodgkin lymphoma—is an AIDS-defining illness and a commonly encountered AIDS-related malignancy [32].

Epstein–Barr virus has been associated with approximately half of AIDS-related Burkitt lymphoma cases [32].

In a study comparing HIV-positive children admitted with malignancy to HIV-negative children with malignancy, Burkitt lymphoma was found to occur 7.2 times as frequently in the HIV-positive group [33].

Although HIV-associated Burkitt lymphoma typically involves the abdominal organs and bone marrow, our patient presented with a left-sided mandibular mass.

MRI revealed a T1 and T2 iso-intense subcutaneous mass posterior to the left mandibular angle, with heterogeneous enhancement post-contrast and associated posterior triangle lymphadenopathy (Fig. 12).

Mucoepidermoid carcinoma

Malignant parotid gland tumours are very rarely observed in children, particularly those under 10 years of age [34, 35].

A review of 122 paediatric patients with salivary gland tumours found only 17 to be malignant. All 17 occurred between the ages of 11 and 18 [35], while our patient presented at just 7 years of age.

According to Belghiti et al., fewer than 19 cases of malignant parotid gland tumours in children have been published, with mucoepidermoid carcinoma accounting for approximately one third of these [34].

Although a clear link between mucoepidermoid carcinoma and HIV has yet to be established, Serraino et al. described an increased age-standardised incidence of salivary gland cancer in HIV-positive adult men compared with HIV-negative men [36].

Imaging appearance is linked to histological grade, ranging from a well-circumscribed heterogeneous parotid space mass to a more invasive, ill-defined tumour with associated lymphadenopathy [37].

In our example, the left intra-parotid mass was well-defined, hyperintense to muscle on T2, iso- to hyperintense on T1, and enhanced avidly post-contrast. There were
intratumoral cysts and necrosis as well as bilateral cervical and posterior triangle lymphadenopathy (Fig. 13).

Conclusions

Although infective causes account for the majority of cases of paediatric facial masses or mass-like lesions, there is a much wider spectrum of more unusual aetiologies, which have been highlighted in this pictorial essay, and to which radiologists should be alerted in order that appropriate treatment is not delayed.

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References

1. Khanna G, Sato Y, Smith RJH et al (2006) Causes of facial swelling in pediatric patients: correlation of clinical and radiologic findings. Radiographics 26:157–171
2. Wang DY, Vachani JD (2013) On approach to facial swelling: tooth or fiction. Hosp Pediatr 3:70–73
3. Robson CD (2010) Imaging of head and neck neoplasms in children. Pediatr Radiol 40:499–509
4. Cunningham MJ, Myers EN, Bluestone CD (1987) Malignant tumors of the head and neck in children: a twenty-year review. Int J Pediatr Otorhinolaryngol 13(3):279–292
5. Robinson TL, Surapaneni K, Nardi PM (2008) Intracanal fistiform teratoma. Pediatr Radiol 38(3):336–339
6. Weiss JR, Burgess JR, Kaplan KJ (2006) Fetiform Teratoma (Homunculus). Arch Pathol Lab Med 130:1552
7. Kennedy A. Twin Related Anomalies. [Online] Available at: https://my.statdx.com/STATdxMain.jsp?rc=false#dxContent;twin_related_anomalies_expert-ddx Accessed 13 March 2014
8. Higgins KR, Coley BD (2006) Fetus In Fetu and Fetaform Teratoma in 2 Neonates – An Embryologic Spectrum? J Ultrasound Med 25:259–263
9. Chigurupati R, Alfatooni A, Myall RWT et al (2002) Oropharyngeal rhabdomyosarcoma in neonates and young children: a review of literature and management of four cases. Oral Oncol 38:508–515
10. Anton CG. Rhabdomyosarcoma, Musculoskeletal. StatDx [Online] Available at: https://my.statdx.com/STATdxMain.jsp?rc=false#dxContent;rhabdomyosarcoma__musculoskeletal Accessed 19 March 2014
11. Nicolau Y, Faquin WC, Deschler DG (2010) Hamartoma of the parotid gland: report of a unique case. Ear Nose Throat J 89(5):E8–E10
12. Burrell J, Williams CJ, Bain G et al (2007) Tuberculosis: a radiologic review. RadioGraphics 27:1255–1273
13. Imamura M, Kakihara T, Yamamoto K et al (2004) Primary tuberculous osteomyelitis of the mandible. Pediatr Int 46:736–739
14. Erasmus JH, Thompson IOC, van der Westhuizen AJ (1998) Tuberculous osteomyelitis of the mandible: report of a case. J Oral Maxillofac Surg 56:1355–1358
15. Yencha MW (2001) Head and neck pilomatrixoma in the pediatric age group: a retrospective study and literature review. Int J Pediatr Otorhinolaryngol 57:123–128
16. Lim HW, Im SA, Lim G et al (2007) Pilomatrixomas in children: imaging characteristics with pathologic correlation. Pediatr Radiol 37:549–555
17. O’Connor N, Patel M, Umar T et al (2011) Head and Neck pilomatrixoma: an analysis of 201 cases. Br J Oral Maxillofac Surg 49:354–358
18. Triantafillidou K, Venetis G, Karakinis G et al (2011) Central giant cell granuloma of the jaws: a clinical study of 17 cases and a review of the literature. Ann Otol Rhinol Laryngol 120(3):167–174
19. Perschbacher S. Central Giant Cell Granuloma, Mandible-Maxilla. StatDx [Online] Available at: https://my.statdx.com/STATdxMain.jsp?rc=false#dxContent;mandible_maxilla_giant_cell_granuloma_ Accessed 19 March 2014
20. Koenig L. Schwannoma, Mandible-Maxilla. StatDx [Online] Available at: https://my.statdx.com/STATdxMain.jsp?rc=false#dxContent;schwannoma__Accessed 19 March 2014
21. Minhas RS, Thakur JS, Sharma DR (2013) Primary schwannoma of maxillary sinus masquerading as malignant tumour. BMJ Case Rep. doi:10.1136/bcr-2013-009267
22. Manaster BJ. Fibrosarcoma. StatDx [Online] Available at: https://my.statdx.com/STATdxMain.jsp?rc=false#dxContent;fibrosarcoma__Accessed 19 March 2014
23. Tarik E, Iamiae R, Abdelouahed A et al (2013) Unusual case of congenital/infantile fibrosarcoma in a newborn. Afr J Paediatri Surg 10(2):185–187
24. Rahman HA, Sedky M, Mohsen I et al (2013) Outcome of pediatric parameningeal rhabdomyosarcoma. The Children Cancer Hospital, Egypt, experience. J Egypt Natl Canc Inst 25:79–86
25. Pasricha S, Gupta A, Shah M et al (2010) Extragonadal yolk sac tumor of face in a female infant: a case report. Indian J Pathol Microbiol 53:592–593
26. Furtado LV, Leventaki V, Layfield LJ et al (2001) Yolk Sac tumor of the thyroid gland: a case report. Pediatr Dev Pathol 14:475–479
27. Raviele PR, Pruneri G, Maiorano (2009) Plasmablastic lymphoma: a review. Oral Dis 15:38–45
28. Horváth E, Krenács L, Bagdi E et al (2008) Plasmoblastic lymphoma associated with human immunodeficiency virus. Romanian J Morphol Embryol 49(3):309–314
29. Castillo JJ, Reagan JL (2011) Plasmablastic lymphoma: a systematic review. Sci World J 11:687–696
30. Sharma A, Tilak T, Lodha R et al (2013) Long-term survivor of human immunodeficiency virus-associated plasmablastic lymphoma. Indian J Med Paediatri Oncol 34:96–98
31. Pathier S, MacKinnon D, Padayachee R (2013) Plasmablastic lymphoma in pediatric patients: clinicopathologic study of three cases. Ann Diagn Pathol 17:80–84
32. Munn S (2002) Imaging HIV/AIDS. Burkitt’s Lymphoma. AIDS Patient Care STDS 16(8):395–399
33. Stefan DC, Stones DK (2013) Children with cancer and HIV infection: what is different about them? J Pediatr Hematol Oncol 35(8):590–596
34. Belghiti H, Znati, Harmouch T et al (2011) Mucoepidermoid carcinoma of the parotid gland in young children. [In French]. Rev Stomatol Chir Maxillofac 112(2):110
35. Fang Q, Shi S, Li Z et al (2013) Epithelial salivary gland tumors in children: a twenty-five year experience of 122 patients. Int J Pediatr Otorhinolaryngol 77:1252–1254
36. Serraino D, Boschin A, Carriere P et al (2000) Cancer risk among men with, or at risk of, HIV infection in southern Europe. AIDS 14:533–559
37. Branstetter BF. Mucoepidermoid Carcinoma, Parotid. StatDx [Online] Available at: https://my.statdx.com/STATdxMain.jsp?rc=false#dxContent;mucoepidermoid_carcinoma Accessed 19 March 2014