OPEN ACCESS

Case Report

Rhinophyma in tuberous sclerosis complex: case report with brief review of literature

Diagnose und Behandlung eines Rhinophyms bei Tuberöse-Sklerose-Komplex

Abstract

Tuberous sclerosis or tuberous sclerosis complex (TSC) is an autosomal dominant inherited disease characterized by the triad epilepsy, hamartomas (angiofibroma) and reduced intellectual capacity. Phenotype can vary considerably. Almost all patients with TSC have at least one characteristic dermatologic feature. Facial angiofibroma can cause severe disfigurement. It may involve the cheeks, perioral region and nose, resulting in thick layers of nodular and pustular skin. Aesthetic surgery of the face comprises an individually adapted ablation of the affected skin regions in order to improve physical appearance. Reports on the subject of surgery for nasal angiofibroma confirm the homogenous transformation of the connective tissues by this hamartoma. Hitherto there is only one report in the literature describing the typical epithelial alterations of the nasal skin compatible with a rhinophyma and adjacent angiofibroma. Here we report the successful electrosurgical treatment of a patient with TSC and extensive sebaceous glands giving rise to a rhinophyma in close association with angiofibroma.

Keywords: tuberous sclerosis, rhinophyma, angiofibroma, adenoma sebaceum, rhinophyma surgery, rhinophyma surgical, disfigurement, electrosurgery, phacomatosis

Zusammenfassung

Die tuberöse Sklerose oder Tuberöse-Sklerose-Komplex (TSK) ist eine autosomal dominante Erbkrankheit, die durch die Trias Epilepsie, Hamartome (Angiofibrome) und häufige Minderbegabung gekennzeichnet ist. Der Phänotyp kann stark variieren. Die fazialen Angiofibrome können entstellendes Ausmaß erreichen und neben der Wangenhaut und perioralen Regionen auch die Haut der äußeren Nase infiltrieren und diese knotig umbauen. Die chirurgische Hilfe besteht in der Ablation der aufgeworfenen, knotig-pustolösen Haut. Berichte über die chirurgische Konturierung der Nase bei TSK bestätigen den homogenen Umbau der Nasenhaut durch Angiofibrome. Lediglich ein Bericht beschreibt die typischen epithelialen Veränderungen vergrößerter Talgdrüsen mit Ausbildung eines Rhinophyms assoziiert mit einem Fall von TSK. Dieser eigene Bericht beschreibt die erfolgreiche elektrochirurgische Behandlung einer extrem vergrößerten und verformten Nase mit der Koinzidenz von Rhinophym und Angiofibrom bei TSK.

Reinhard E. Friedrich[1]
Christian Hagel[2]

1 Department of Oral and Cranio-Maxillo-Facial Surgery, Eppendorf University Hospital, University of Hamburg, Germany

2 Institute of Neuropathology, Eppendorf University Hospital, University of Hamburg, Germany

Introduction

Tuberous sclerosis or tuberous sclerosis complex (TSC) is a rare inherited genetic disorder affecting many organs, predominantly the skin, brain, heart, lungs and kidney [3], [5], [23], [24], [34]. The disease is transmitted in an autosomal dominant fashion and the phenotype may vary widely, with mildly affected patients noticeable through butterfly-like erythema on the one end and oligophrenic and totally incapacitated individuals on the other end of the disease spectrum [24]. Central nervous system manifestations are a common source of morbidity, e.g. infantile spasms [14], seizures, intellectual disability, and neoplasms (giant-cell astrocytoma) [17], [29]. Epilepsy is very frequently, though not invariably, diagnosed in TSC affected individuals [24], [29]. Common causes of mortality are pulmonary lymphangioleiomyomatosis, kidney angiomyolipomas, and cardiac rhabdomyoma [5], [27], [34]. Almost all patients with TSC have at least one characteristic dermatologic feature [33]. Facial angiofibroma (adenoma sebaceum) is the best known skin alteration in TSC [31]. TSC belongs to the group of phacomatoses [31] and these diseases are conspicuous due to their alterations of the integument that should alert the clinician to look for other signs and symptoms of these multisystem diseases [28]. Interdisciplinary diagnosis and treatment is required in TSC [14].
Facial angiofibroma can cause severe facial disfigurement [18]. The lesions usually arise bilaterally in the cheek region but may also involve the perioral region and even the nose, producing thick layers of nodular and pustular skin [12], [11]. Debulking procedures with different tools to ablate the skin are the measures applied in facial aesthetic surgery to improve physical appearance [1], [2], [19], [21], [30]. Reports on the subject of surgery for angiofibroma confirm the homogenous transformation of the connective tissues by this hamartoma [25]. Only one earlier report describes the typical epithelial alterations of the nasal skin compatible with a rhinophyma and adjacent angiofibromas [2]. This new report describes the surgical treatment of a patient with TSC and extensive sebaceous glands giving rise to a rhinophyma in close association with angiofibroma.

Case presentation

The 23-year-old male was referred from the medical consultant of a special-care home, where the patient lived a supervised life. The patient had manifested convulsive seizures since early childhood and had developed widespread angiofibroma throughout his face. The patient was in excellent general health conditions, intellectually disabled and presented himself as an open-hearted and physically active individual who asked for medical help to reduce his steadily growing nose. The caregiving assistant reported the nose to be prominent ever since he got to know him. However, the remarkable growth of the nose had become apparent about one year ago. He also reported that the patient immigrated with his parents to Germany several years ago. In Russia, a skin excision had been performed on the right forehead region and covered with a skin graft about 10 years ago, probably to reduce the extensive angiofibroma. He was on medication with carbamazepin (Timonil™ 600-0-600 mg/d), risperidon (Risperdal™, 2-0-1 mg), pipamperon (Dipiperon™ 40 mg, 1-1-1-2), and phenobarbital (Luminal™ 0-0-1). Medical reports detailed an internal carotid aneurysm.
The erythemateous facial skin (forehead, cheek, nose, chin) was covered with groups of papules and nodules that discharged smear upon pressure (Figure 1A and B). In view of the general condition of the patient, in particular notice of emotional fluctuations, and the extensive facial hamartoma we decided to perform surgery in general endotracheal anesthesia.

Surgery

The rhinophyma was removed in layers using an electrosurgical needle (Figure 1C). Incision of the soft tissues exposed giant sebaceous glands at the tip of the nose and both broad alae. The bleeding from the wound bed was sporadic. After reduction of the nasal contour the elevated angiofibrotic surface of the cheek of the left side was ablated in the same way. Wound surface was covered with a white soft paraffin impregnated tulle (Oleo-Tüll™, Sanofi-Aventis, Frankfurt, Germany) additionally covered with antibiotic ointment. Uneventful healing was achieved by secondary intention (Figure 1D and E).In addition, a hyperplastic region of the frontal skin graft was excised, primarily closed and the excised specimen was prepared for histological investigation. Six years later, the patient returned for further ablation of cheek angiofibromas. On this occasion, the stable contouring of the nose was documented (Figure 1F and G).

Histology

The specimen from all three nasal sites, i.e. the nasal tip and alae, showed epidermis with large sebaceous glands and prominent epidermal invaginations, in part containing retained keratin. Lymphocytes, granulocytes and a few plasma cells were located around follicles and even more around vessels. Enlarged capillaries compatible with angiofibroma predominated in the subepidermal layers (Figure 2). All findings were compatible with diagnosis of rhinophyma. Sparse MIB-1 immunoreactivity was restricted to round cell infiltrates and S-100 positive cells were identified in small clusters of inflammatory cells. The specimen from the nasolabial fold region showed perifollicular and perivascular round cell infiltrates. The skin graft excision appeared to be hyperplastic scar tissue with chronic inflammatory invasion upon microscopic investigation but without evidence for local recurrence of angiofibroma.

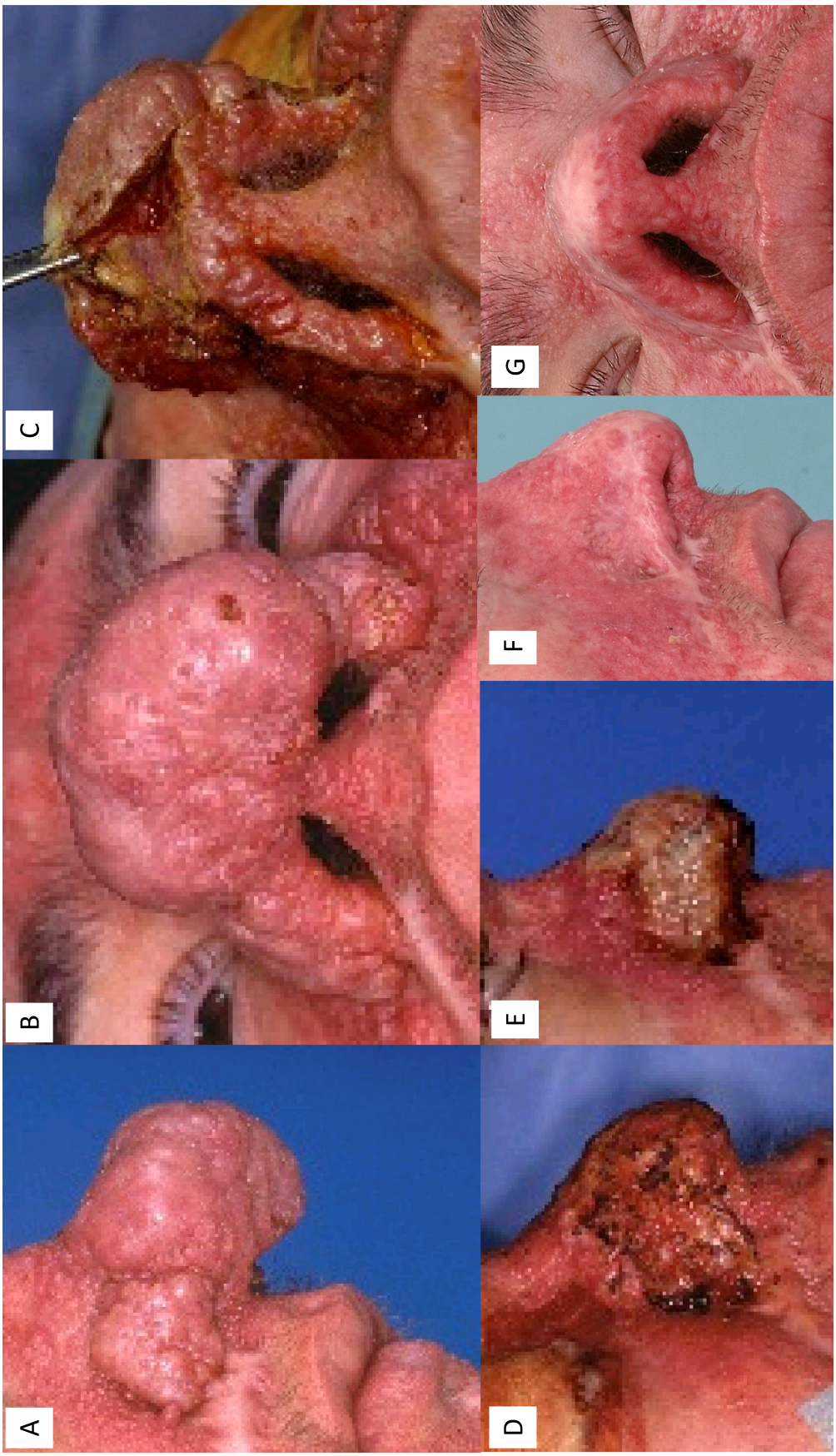

Figure 1: Rhinophyma in tuberous sclerosis complex patient at the time of admission, profile (A) and en face (B) photographs of the nose. Debulking procedure of the rhinophyma exposes fibrous tissues with enlarged sebaceous glands (C). Electrosurgical remodeling of the nose's shape (D) and uneventful wound closure during secondary re-epithelialization of the nose (20 days after surgery (E)). Six years later (F, G) the shape of the nose has remained unchanged but a slight and partial recurrence of angiofibroma is visible.

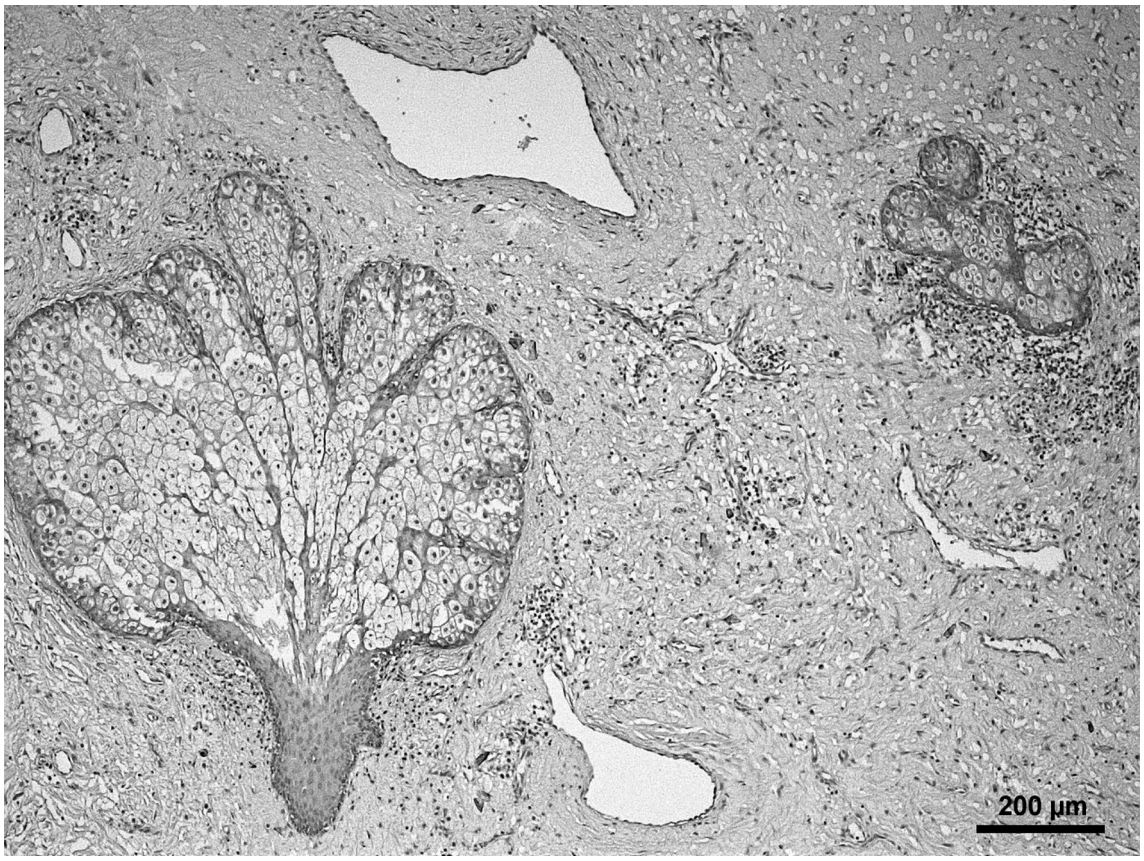

Figure 2: Dermal histopathology presenting as groups of dilated thin walled vessels in fibrous tissue and hyperproliferative sebaceous glands, H&E stain.

Discussion

This case report describes the successful reduction of a rhinophyma in a patient affected by TSC. Disfigurement of the nose due to proliferation of angiofibroma in TSC patients was repeatedly reported [11], [13], [16], [30]. However, following the case report of Bernstein in 1978 [2] this is likely to be the second description of a rhinophyma in conjunction with an angiofibroma (adenoma sebaceum). Lasting improvement of the appearance was achieved by an electrosurgical debulking of the severely deformed nose.

TSC

TSC is an autosomal dominant inherited disease. The most prevalent findings are malformation and neoplasia of the brain, alterations of the skin and usually benign tumours developing in other organs. Clinical dominant findings are epileptic seizures and cognitive disabilities. Public awareness is meager about genetic syndromes with prominent skin alterations and multi-organ involvement, including a predisposition for cancer [28]. These rare diseases often have incomplete penetrance and variable expressivity. Prevalence of TSC is about 1:8,000. In about 30% of TSC patients one of the parents is also affected by the disease. TSC is also known as Bourneville-Brissaud-Pringle syndrome, named after the individuals who originally described the entity [3], [23]. The alternative denotation 'TSC' avoids the eponyms but puts emphasis on the complex of different signs and symptoms occurring in the affected individual. TSC is a multisystemic neurocutaneous syndrome caused by mutation of tumor suppressor genes, TSC1 and TSC2 (TSC1 on chromosome 9q34 (hamartin) and TSC2 on chromosome 16p13.3 (tuberin) [20].

Angiofibroma and other skin alterations

Hamartomas in various organs are the hallmark of the disease. Faciocutaneous manifestations of hamartomas are diverse and appear to be frequently neglected in clinical practice [28]. They occur in more than 90% of TSC patients [32].

Sebaceous adenoma is declared a misnomer that should be replaced by the term 'angiofibroma' to correctly address the characteristic maculo-papular lesions, consisting of dense fibrous tissues and abnormal vessels [25]. However, the term 'adenoma sebaceum' is a still in use [9], [16], [30]. The eye-catching skin disease is not related to the sebaceous glands, but is recognized as a benign tumour with both angiomatous and fibrous components. Alterations in contiguous sebaceous glands and other adnexal organs are solely secondary phenomena [25]. However, facial angiofibroma can gain such a huge size that functional barriers occur (ingestion) and the physical appearance of the angiofibroma simulates a rhinophyma [18]. On the other hand, in the present case, the hyper-

proliferation of the sebaceous glands dominated in the deformed nose, giving rise to diagnose a 'rhinophyma'. This side by side of huge sebaceous glands and angiofibroma was previously reported by Bernstein [2] and this observation may have contributed to use further on the outdated term 'adenoma sebaceum'.
The angiofibroma usually manifests in the first decade of life, but may already be present at birth [23]. Growth spurts are frequently observed at the end of puberty [4]. However, facial angiofibroma may develop throughout life [28], [32]. Patients older than 20 years of age appear to experience less recurrence of angiofibroma after surgical treatment than younger individuals. Facial angiofibroma in syndromal diseases are not restricted to TSC [6]. Other skin marks in TSC are shagreen patches in the lumbo-sacral region, oval hypomelanotic lesions of ash-leaf outline, café-au-lait spots and periungal fibromas [33]. The excised facial scar tissue showed no similarities to a fibroma [26].

Surgery

Several surgical techniques for ablation of rhinophyma have been suggested, such as a blade/shave excision [2], [7], dermabrasion [9], [19], [20], cryosurgery [8], laser with different energy sources [15], [16], [18], [22], carbondioxide laser resurfacing with fibrin sealing [21], electrosurgery/diathermy [4], [18], a combination of laser and electrosurgery [1] or further techniques in a single patient [1], [18], and high-frequency ablation [11]. All techniques proved to be sufficient to reduce the soft tissue overgrowth without damage to the cartilage. However, different attitudes exist concerning the coverage of the defects. Some authors used skin graft for coverage of the defects [2], others do not [11]. Hyperpigmentation was noted after laser ablation [16] and radiofrequency [30]. Recurrence of hamartomas is a disadvantage of several treatment measures. In the present case the spontaneous re-epithelialization of the nose resulted in an acceptable profile and functional coverage. However, recurrence of angiofibroma was recognized. No hyperpigmentation occurred in the re-epithelialized regions of the nose after six years follow-up.

Conclusion

Electrosurgical reduction of the extremely deformed nose was a simple and effective treatment with proven long-lasting improvement of physical appearance in a patient with TSC who had developed a rhinophyma.

Notes

Competing interests

The authors declare that there is no conflict of interest concerning the present publication.

Funding sources

None.

References

1. Bae-Harboe YS, Geronemus RG. Targeted topical and combination laser surgery for the treatment of angiofibromas. Lasers Surg Med. 2013 Nov;45(9):555-7. DOI: 10.1002/lsm.22189
2. Bernstein D. Rhinophyma in tuberous sclerosis. Otolaryngology. 1978 Nov-Dec;86(6 Pt 1):904-8.
3. Bourneville DM, Brissaud E. Encéphalite ou sclérose tubéreuse des circonvolutions cérébrales. Arch neurol (Paris). 1881;1:390-412.
4. Capurro S, Fiallo P. Timed surgery for treatment of angiofibromas in tuberous sclerosis. Dermatol Surg. 2001 May;27(5):486-8.
5. Ciancio SJ, Vira M, Simon MA, Lerner SP, Schulam PG. Giant bilateral renal angiomyolipomas associated with tuberous sclerosis. Urology. 2001 Mar;57(3):554. DOI: 10.1016/S0090-4295(00)01051-7
6. Darling TN, Skarulis MC, Steinberg SM, Marx SJ, Spiegel AM, Turner M. Multiple facial angiofibromas and collagenomas in patients with multiple endocrine neoplasia type 1. Arch Dermatol. 1997 Jul;133(7):853-7. DOI: 10.1001/archderm.1997.03890430067009
7. Drake DB, Morgan RF, Cooper PH. Shave excision and dermabrasion for facial angiofibroma in tuberous sclerosis. Ann Plast Surg. 1992 Apr;28(4):377-80. DOI: 10.1097/00000637-199204000-00015
8. Dvir E, Hirshowitz B. The use of cryosurgery in treating the fibrous papules of tuberous sclerosis. Ann Plast Surg. 1980 Feb;4(2):158-60. DOI: 10.1097/00000637-198002000-00015
9. El-Musa KA, Shehadi RS, Shehadi S. Extensive facial adenoma sebaceum: successful treatment with mechanical dermabrasion: case report. Br J Plast Surg. 2005 Dec;58(8):1143-7. DOI: 10.1016/j.bjps.2005.04.021
10. Fischer K, Blain B, Zhang F, Richards L, Lineaweaver WC. Treatment of facial angiofibromas of tuberous sclerosis by shave excision and dermabrasion in a dark-skinned patient. Ann Plast Surg. 2001 Mar;46(3):332-5. DOI: 10.1097/00000637-200103000-00022
11. Gomes AA, Gomes YV, Lima FB, Pessoa SG. Multiple facial angiofibromas treated with high-frequency equipment. An Bras Dermatol. 2011 Jul-Aug;86(4 Suppl 1):S186-9.
12. Hall MR, Kovach BT, Miller JL. Unilateral facial angiofibromas without other evidence of tuberous sclerosis: case report and review of the literature. Cutis. 2007 Oct;80(4):284-8.
13. Hamilton HK, Tonkovic-Capin V. Images in clinical medicine. Facial angiofibromas associated with tuberous sclerosis. N Engl J Med. 2011 Mar 17;364(11):1061. DOI: 10.1056/NEJMicm1005598
14. Humphrey A, MacLean C, Ploubidis GB, Granader Y, Clifford M, Haslop M, Neville BG, Yates JR, Bolton PF; Tuberous Sclerosis 2000 Study Group. Intellectual development before and after the onset of infantile spasms: a controlled prospective longitudinal study in tuberous sclerosis. Epilepsia. 2014 Jan;55(1):108-16. DOI: 10.1111/epi.12484
15. Janniger CK, Goldberg DJ. Angiofibromas in tuberous sclerosis: comparison of treatment by carbon dioxide and argon laser. J Dermatol Surg Oncol. 1990 Apr;16(4):317-20. DOI: 10.1111/j.1524-4725.1990.tb00041.x

16. Kaufman AJ, Grekin RC, Geisse JK, Frieden IJ. Treatment of adenoma sebaceum with the copper vapor laser. J Am Acad Dermatol. 1995 Nov;33(5 Pt 1):770-4. DOI: 10.1016/0190-9622(95)91814-0

17. Kothare SV, Singh K, Hochman T, Chalifoux JR, Staley BA, Weiner HL, Menzer K, Devinsky O. Genotype/phenotype in tuberous sclerosis complex: associations with clinical and radiologic manifestations. Epilepsia. 2014 Jul;55(7):1020-4. DOI: 10.1111/epi.12627

18. Lujber L, Burián A. Giant nasal mass causing feeding difficulty in tuberous sclerosis. Otolaryngol Head Neck Surg. 2011 Sep;145(3):511-2. DOI: 10.1177/0194599811410280

19. Morgan JE, Mulliken JB. Dermabrasion and limited excision of the fibrous papules of tuberous sclerosis: case report. Plast Reconstr Surg. 1977 Jan;59(1):124-7. DOI: 10.1097/00006534-197701000-00028

20. Narayanan V. Tuberous sclerosis complex: genetics to pathogenesis. Pediatr Neurol. 2003 Nov;29(5):404-9. DOI: 10.1016/j.pediatrneurol.2003.09.002

21. Pantelis A, Bootz F, Kühnel T. Tuberöse Hirnsklerose : Laserdermabrasio und Fibrinversiegelung von fazialen Angiofibromen [Laser skin resurfacing and fibrin sealing as successful treatment for facial angiofibromas in tuberous sclerosis]. HNO. 2007 Dec;55(13):1009-11. DOI: 10.1007/s00106-007-1618-5

22. Pasyk KA, Argenta LC. Argon laser surgery of skin lesions in tuberous sclerosis. Ann Plast Surg. 1988 May;20(5):426-33. DOI: 10.1097/00000637-198805000-00005

23. Pringle JJ. A case of congenital adenoma sebaceum. Br J Dermatol. 1890;2:1-14.

24. Rosser T, Panigrahy A, McClintock W. The diverse clinical manifestations of tuberous sclerosis complex: a review. Semin Pediatr Neurol. 2006 Mar;13(1):27-36. DOI: 10.1016/j.spen.2006.01.008

25. Sanchez NP, Wick MR, Perry HO. Adenoma sebaceum of Pringle: a clinicopathologic review, with a discussion of related pathologic entities. J Cutan Pathol. 1981 Dec;8(6):395-403. DI: 10.1111/j.1600-0560.1981.tb01028.x

26. Sharma B, Prakash S, Sannegowda RB, Panagariya A. Scalp fibroma: a rare cutaneous manifestation of tuberous sclerosis. BMJ Case Rep. 2014 Apr 19;2014. pii: bcr2013200612. DOI: 10.1136/bcr-2013-200612

27. Shen Q, Shen J, Qiao Z, Yao Q, Huang G, Hu X. Cardiac rhabdomyomas associated with tuberous sclerosis complex in children : From presentation to outcome. Herz. 2014 Mar 9.

28. Shen Z, Hoffman JD, Hao F, Pier E. More than just skin deep: faciocutaneous clues to genetic syndromes with malignancies. Oncologist. 2012;17(7):930-6. DOI: 10.1634/theoncologist.2012-0033

29. Skalicky AM, Rentz AM, Liu Z, Wheless JW, Pelletier CL, Dunn DW, Frost MD, Nakagawa J, Magestro M, Prestifilippo J, Pashos C. The Burden of Subependymal Giant Cell Astrocytomas Associated With Tuberous Sclerosis Complex: Results of a Patient and Caregiver Survey. J Child Neurol. 2014 Mar 24.

30. Swaroop Mr, Nischal Kc, Rajesh Gowda Cm, Umashankar Nu, Basavaraj Hb, Sathyanarayana Bd. Radiofrequency ablation of adenoma sebaceum. J Cutan Aesthet Surg. 2008 Jul;1(2):89-91. DOI: 10.4103/0974-2077.44166

31. Van der Hoeve J. Les phakomatoses de Bourneville, de von Recklinghausen et de von Hippel-Lindau. J Belg Neurol Psychiatr. 1933;33:752-62.

32. Wataya-Kaneda M, Tanaka M, Hamasaki T, Katayama I. Trends in the prevalence of tuberous sclerosis complex manifestations: an epidemiological study of 166 Japanese patients. PLoS One. 2013 May 17;8(5):e63910. DOI: 10.1371/journal.pone.0063910

33. Webb DW, Clarke A, Fryer A, Osborne JP. The cutaneous features of tuberous sclerosis: a population study. Br J Dermatol. 1996 Jul;135(1):1-5. DOI: 10.1111/j.1365-2133.1996.tb03597.x

34. Zhang X, Travis WD. Pulmonary lymphangioleiomyomatosis. Arch Pathol Lab Med. 2010 Dec;134(12):1823-8. DOI: 10.1043/2009-0576-RS.1

Corresponding author:
Prof. Dr. med. Dr. med. dent. Reinhard E. Friedrich, FEBOMFS
Department of Oral and Cranio-Maxillo-Facial Surgery, Eppendorf University Hospital, University of Hamburg, Martinistr. 52, 20246 Hamburg, Germany, Phone: +49-40741053259
friedrich.mkg@hotmail.de

Please cite as
Friedrich RE, Hagel C. Rhinophyma in tuberous sclerosis complex: case report with brief review of literature. GMS Interdiscip Plast Reconstr Surg DGPW. 2014;3:Doc12.
DOI: 10.3205/iprs000053, URN: urn:nbn:de:0183-iprs0000537

This article is freely available from
http://www.egms.de/en/journals/iprs/2014-3/iprs000053.shtml

Published: *2014-11-27*