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Original Research

Medical treatment for orbital complications secondary to rhinosinusitis

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Abstract

Background: Despite the modern antibiotherapies applied in the practice of otorhinology, the orbital complications of sinusitis are still considered a serious threat to essential functions of the eye, including loss of vision and life threatening .

Aim: This study aimed to evaluate efficiency of medical treatment in orbital complications secondary to rhinosinusitis.

Methods: It was a hospital based Prospective study. Patients diagnosed with orbital complications secondary to rhinosinusitis were enrolled in this study. During the period January 2014 June 2021, at OtoRhinoLaryngoloy, Head & Neck Department, at Al-Thawra Teaching Hospital, Sana'a, Yemen. All patients underwent to clinical examination, radiological investigations (CT, MRI), initially aggressive medical treatment by IV. antibiotic and locally nasal decongestant for 24-48 hours, if there is no evidence of improvement, we intervened with a surgical procedure, by nasal endoscopy or external approach in the form of external ethmoidectomy to evacuate collection of pus.

Results: A total of 30 patients complained of orbital complications secondary to rhinosinusitis were included in the study. Age ranged between two and 50 year, 73.3% of the patients was males and 26.7% was females. Children were the most category affected 24 patients, right was more than left side ethmoid sinus was the most sinus affected, followed by ethmoid and maxillary sinuses together. Preseptal cellulitis was the commonest complication among the patients (53.3%), orbital cellulitis and subperiosteal abscess occurred in 20% of the patients. Medical treatment succeeded in 80% of the patients, surgical procedure under covering of antibiotic was done in 20% of the patients.

Conclusion: Orbital complications were the most common complications secondary to rhinosinusitis and were more in the children. The outcome of the treatment depended on the types of complications. Medical treatment was showed high efficiency rate.

Keywords: Orbital complications, Rhinosinusitis, Surgical procedure, Medical treatment

1. Introduction

Close proximity of the orbit to the paranasal sinuses makes it the most commonly involved structure in complications of rhosinusitis. Congenital dehiscence in the lamina papyracea which separates the ethmoid sinuses from the orbit exposes the orbital contents to direct extension of rhinosinusitis [1]. In addition, the superior and inferior ophthalmic veins that are valveless, allow direct communication between the nose, ethmoid sinuses, orbit and cavernous sinus and spread of infection.

Orbital involvement primarily results from a thrombophlebitis and interference with the venous drainage of the orbital contents [1,2]. Children appear to be more prone to orbital complications of rhinosinusitis, probably because of their higher rates of upper

respiratory tract infection and rhinosinusitis. The orbital septum is a key anatomical landmark used to differentiate pre-septal and post-septal cellulitis [3]. The orbital complications of rhinosinusitis are classified into five categories; pre-septal, orbital cellulitis sub periosteal abscess, orbital abscess, and cavernous sinus thrombosis. Chandlre's classification [2]. The incidence of orbital complications secondary to rhinosinusitis has been reported between 60 and 91 % but do not appear to be altered during the last 20 years [4,5].

The methods for the treatment of these complications today often debated: conservative, surgical or combined. Surgical options include both endoscopic and open surgery. However, in the era of endoscopic surgery of the paranasal sinuses, there are still no clear advantage of these technique over open intervention [6]. Some studies reported the use of both technique, while some use either, without any comment on the value of these technique [7-9]. The aim of the study was to evaluate the effecting of medical treatment on the orbital complications secondary to rhinosinusitis.

2. Methods

Prospective study was carried out on 30 patients proved have orbital complications of rhinosinusitis. From January 2014 to June 2021, at OtoRhinoLaryngology Department, Al-Thawra Teaching Hospital, Sana'a, Yemen. This study was approved by the ethics committee of our Department. Informed consents were obtained. The patient underwent to clinical examination, anterior rhinoscopy, nasal endoscopy after applying local anesthesia (Xylocain spray 10%), and nasal decongestant drops locally. C T scan of the paranasal coronal and axial, heamatology study was done, culture and sensitivity test.

The patients admitted to the hospital. Emperical treatment was started by amoxicillin and clavulanic acid by I V.route in dose 50mg / kg/day in divided dose every 8 hours for 5 days, then oral same drug for another 10 days (two weeks), dexamethasone in dose 1 mg/ kg / day in divided dose for 5 days then taping for another 5 days and nasal decongestant locally 3 times/day for 5 days. Close observation and clinical evaluation were performed every day. When an improvement in the patient's condition did not occur within 24-48 hours or there is evidence of deterioration of patient's condition, surgical intervention was performed. 6 patients were underwent to surgical intervention, 2 patients by intranasal endoscopy approach, and 4 patients by external approach, using the external ethmoidectomy technique, under covering of antibiotic, this allowed a wide opening, good drainage and clear entry to the nasal cavity.

Inclusion criteria, all patients with orbital complications secondary to rhinosinusitis, Both sex, and all ages, exclusion criteria, fungal sinusitis, nose & paranasal sinuse malignants, congenital anomalies, intracranial complications, uncontrolled diabetes mellitus, and traumatic lesions of the nose. Ophthalmic consultation was done to assess vision and response to the medical treatment.

3. Results

A total of 30 patients were enrolled in this study. Males 24 (73.3%) females 8 (26.7 %), age ranged from 2-50 year mean age 11 years. Children (2-12 year) 24 (80%), while adults were (30-50 year) 6 (20%) patients. This indicated that the children were the most age categories affected with orbital complications. Right side was more affected than left, 16 to 14 patients, respectively. The ethmoid, ethmoid and maxillary sinuses were secondary affected. Clinical presentations were showed in Table 1. The main presentations were eye lid oedema (Figure 1) pain, and nasal obstruction. Figure 2 shows the type of complications reported by this study. Case of intraorbital abscess has complaining of blindness, while a case with cavernous sinus thrombosis was expired after one week after admission to the hospital. Methods of treatment showed in Figure 3. The method of treatment depends on type of complications, 24 patients (80%) underwent to medical treatment and 6 (20%) patients treated by combined modality, medical and surgical.

Table 1: Clinical presentation of orbital complications among the study patients (n=30)

Item	Frequency	Percentage
Eye lid oedema	30	100
Pain	30	100
Nasal obstruction	30	100
Kemosis	14	47.6
Tenderness	30	100
Nasal discharge	20	66.7
Proptosis	14	47.7
Ocular movement limitation	14	47.7
Ethmoid sinus fistula	1	3.3

Figure 1: Orbital oedema was one of the most clinical presentations reported by the study

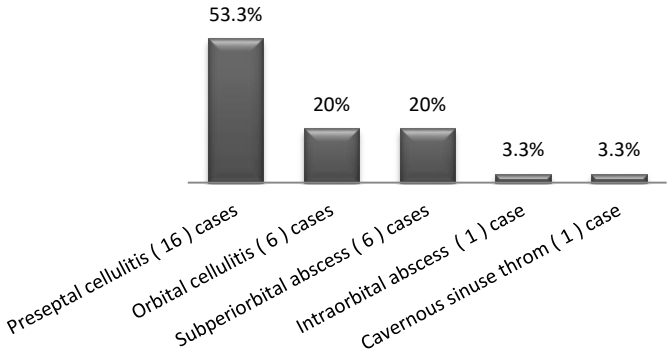

Figure 2: Type of complications among the study patients (n=30)

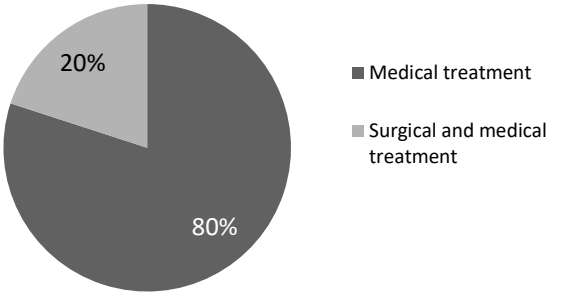

Figure 3: Methods of treatment among the study patients (n = 30)

4. Discussion

By virtue of the intimate anatomical relationship between the orbit and the surrounding paranasal sinuses, infection from the sinuses can gain entry into the orbital via several pathways namely through natural defects present in the bony walls that served as partitions between the orbit and paranasal compartments, erosion sinus walls secondary to bony necrosis that resulted from periosteal ischaemia induced by the increased in intrasinus pressure that occur in acute sinusitis, and via numerous valveless venous channels that provide a further avenue for extension of infection [8]. Despite the advent of antibiotics and better imaging technique the morbidity of blindness as result of orbital complications has not been fully over comed that is 10% incidence of blindness compared to 20% incidence in pre-antibiotics era [10]. The periosteal is a strong barrier to infection and provides clinicians with time before they are faced with serious complications [6].

Children were the most common category affected in our study, in 80 % of patients whereas children have frequented attacks of upper respiratory infections and an immature the immune system. These results were consisted with previous studies[4,6,9,11,12]. Male patients more than female patients without clear explanation for this observation. It is believed that the female immune system is more proficient than that of males [13].The ethmoid sinus is most commonly seen to be involved in orbital complications specially in children. This is attributed to close relation between the orbit and the ethmoid sinus with thin line separation between them. The right sinuses involvement is commoner than the left. These results agreement with some previous studies[12,14]. Preseptal cellulitis was the most infection found in out series in 53.3% of cases, and treated on outpatient. Radovani et al [6], reported that the most commonly occurring complication is palpebral inflammatory oedema (preseptal cellulitis), it encountered more often in children. The upper eyelid becomes swollen and hyperaemic due to a blockage of vein drainage from an ethmoid sinusitis. Chemosis and proptosis are absent, both of which usually indicated postseptal infection. Vision remains unaffected and the eyeball moves in all directions [4,6].

Another study reported that periorbital abscess was the most commonly complications secondary to rhinosinusitis was occurred in 58 % of cases [14]. This finding against our result. Periorbital cellulitis was foud in 20% of our series, all of them treated medically with success rate 100%. This result is similar to previous studies which reported that orbital cellulitis was occurred in 22% of cases and treated medicaly[11,14]. Unfortunately, when a patient presents with periorbital cellulitis it is not easy to defined which stage the disease has reached on clinical signs alone and it must be remembered that half of cases with intracranial complications present with periorbital cellulitis [15]. Orbital cellulitis occurs when infection spreads posterior to the orbital septum and can lead to abscess if not adequately treated.

Radiological examination is required when orbital abscess is suspected [8,16]. Periorbital abscess is collection of pus between the lamina papyracea and the orbital periosteum. Proptosis, chemosis, and limited movement of the eye ball are present. Radovani et al [6] reported that all cases in this series were underwent surgical intervention under the protection of combined antibiotherapy. The appearance of proptosis, as well as chemosis, indicated that the spread an inflammatory process in the anterior part of the orbit. In our study, there was 20 % of cases presented with subperiosteal abscess, two cases was presented with early and small subperiosteal abscess those treated medically, by I.V. locally decongestant and intranasal endoscopy with good results whereas four cases treated by combined modalities, surgical intervention through external approach under covering of antibiotics.

Previous studies reported that all cases with subperiosteal abscess were treated by surgical drainage external and transnasal approaches [8,9,17]. There have been literatures [18,19] reported on the role of vigorous medical therapy alone for post-septal involvement in selected cases, the selected criteria proposed by Oxford et al [19] includes normal vision, absence of ophthalmoplegia, intraocular pressure < 20 mmHg, proptosis of 5 mm or less and an abscess width of 4 mm or less on CT scan. In our study, there was one case presented with intraorbital abscess, and other case with cavernous sinus thrombosis presented with bilateral orbital swelling, these two cases were treated by combined modalities therapy, surgical and medical. In spite of vigorous medical treatment and surgical drainage by external approach, intra-orbital abscess was end with loss of vision and cavernous sinus thrombosis patient expired after one week of admission to the hospital. The pathogenesis of vision loss for orbital complications patients thrombophlebitis of valveless orbital veins causing retinal ischemia or optic neuropathy as a reaction to neighboring infection [20]. An accumulation of pus begins in the retro-orbital adipose tissue. This is a more severe complication because it makes up the precedent for the thrombosis of the cavernous sinus, or

passing of the infection through nervous route into the intracranial space [6].

One patient was presented with fistula of the right ethmoid sinus, the parents refused surgical intervention as first line of the treatment at the time of presentation, later on this patient was underwent to external the ethmoidectomy with good prognosis. One of the main clinical indications of surgery is imaging that demonstrates an abscess or potential compromise of critical structures, such as the eye or brain [21]. Signs that indicate abscess formation include, decrease in vision, proptosis, ophthalmoplegia and pain associated with eye movement limitation [11].

Orbital complications of sinogenic origin should always be treated as emergency and treated aggressively as it poses life-threatening intracranial complication and blindness. Recognition, correct diagnosis, and appropriate treatment is necessary to avoid orbital complications of sinogenic origin [22,23]. Rhinosinusitis is the most common cause of orbital infection in the children. Orbital complications secondary to rhinosinusitis can result in permanent blindness or death if not treated promptly and appropriately [24,25]. The outcomes of treatment depended on the number and types of complications and general condition of the patient [25]. Early presentation, effective antibiotics and co-management with other specialist improved outcome.

There is need for health education to avoid over-counter drugs, treat predisposing problem such as sinusitis and dental infection [26,27]. Clinical diagnosis of the orbital infection is not always easy. Antibiotics choice depend on the extension of the infection, and should cover the main organisms cause these infections [28,29].

5. Conclusion

Orbital complications secondary to rhinosinusitis are the most common in the children. Orbital Complications can result in permanent blindness or death if not treated promptly and appropriately. The early recognition and aggressive treatment of orbital complications are the mainstay to reduction of unwanted complications and morbidity. The majority of patient were treated medically with good responding, while surgical procedure is done for small group of the patients.

Competing interests

The authors declare that they have no competing interests.

References

1. Hermann BW, Forsen JW. Simultaneous intracranial and orbital complications of acute rhinosinusitis. Int J Pediatr OtoLaryngol. 2004;68:619-625.
2. Chandler JR, Langebrunner DR, Stevens ER. The pathogenesis of orbital complications in acute sinusitis. Laryngoscope. 1970;80;1414-1428.
3. Wong SL, Levi J. Management of pediatric orbital complications: a systemic review . Int. J Pediatric Otorhinolaryngol. 2018;110:123-129. Doi;10.1016/ijporl.2018,05.006
4. Courdert A, Khalfallah S, Suy P, Truy E. Microbilogy and antibiotic therapy of subperiosteal orbital abscess in children with acute ethmoiditis .Int J Pediatric Otorhinolaryngol. 2018;106:91-95.
5. Babar T F, Zama M, Kan MN, Kan MD. Risk factors of pre-septal and orbital cellulitit.J Call physicians Surg Pak 2009;19:39-42
6. Radovani P, Vasili D, Xhelili M, Dervishi J. Orbital complications of sinusitis. Balkan Med J. 2013;30:151-154.
7. Ali A, Kurien M, Matheus SS, Mathew J. Complications of acute infective rhinosinusitis experience from a developing country.Singapore Med J. 2005;46:540-544.
8. Suhaili DN, Goh BS, Gedeh BS. A ten years retrospective review of orbital Complications secondary to acute sinusitis in children. Med J Malaysia. 2010;65(1):49-52.
9. SiedeK V, Kemer A, Betz CS, Tschiesner U, Berghaus A, Leunig A. Management of orbital complications due to rhinosinusitis. Eur Arch Otorhinolaryngol. 2010;267:1881-1886.
10. Chang YS, Chen PL, Hung JH,Chen HY, Lai CC, Ou Y, et al. Orbital complications of paranasal sinusitis in Taiwan,1988 through 2015: acute ophthalmological manifestations, diagnosis and management. Plose One. 2017;12(10):e184477.
11. AL-Madani MV, Khatatbeh AF, Rawashdeh RS, AL-Khoum NF, Shawagefeh NR. The prevalence of orbital complications among children and adults with acute rhinosinusitis. Braz J Otorhinolaryngol 2013.79:http//dx doi org/10-5935/1808-8694.2013131
12. Pena MT, Preciado D, Orestes M, Choi S. Orbital complications of acute sinusitis change in the post-pneumococcal vaccine Era. JAMA Otolaryngol Head Neck Surg. 2013;139(3):223-227
13. Mortimore S, Wormald PJ. The Goote Schuur hospital classification of the orbital complications of sinusitis. J Larynol Otol. 1997;111:719-723.
14. Peter A, Mohammed DI. Results of orbital cellulitis treatment. J Natural Scien Rerearch 2012;2(5): 91-95
15. Jones NS, Walker JL, Bassi S, Jones T, Punt J. The intracranial complications of rhinosinusitis: can they be prevented? Laryngoscope 2002;112:59-63.
16. Bolinaga U, Petez N, Labato R, Martinez-Seijas P, Sumtier Perez E. Abscess of the orbit as a complication of acute sinusitis: surgical approach. Eur Arch of otorhinolaryngol. 2009;266:(A368):1037-1038.
17. Rubin F, Pierrot S , lebreton M, Contencin P, Couloigner V. Drainage of subpereosteal orbital abscess complicating pediatric ethmoiditis: comparison between external and trasnasal approaches. Int J Pediatric Otorhinolaryngol. 2013;77(5): 796-802
18. Wong SJ, Levi J. Management of pediatric orbital cellulitis: a systemic review. Int J pediatr Otorhinolaryngol. 2018;110:123-129.
19. Oxford LE, McClay J. Medical and surgical management of subperiosteal orbital abscess secondary to acute sinusitis in children. Int J Pediatr Otorhinolaryngol. 2006;70(11):1853-1861.
20. Ismi O, VayisogluY, Dinc E, Yildirim O, Unal M. Central retinal artery occlusion and irreversible blindness due to paranasal sinus infection in a pregnant women. J Craniofac Surg. 2014;25:557-579.
21. Dhangra BA, Linder L, Preciado DA, Taylormoore J, Shah RK. Orbital pireorbital infections Anational prespective.Arch Otolarygol Head Neck Surg. 2011;137(8):769-773.
22. Chavan SS, Deshmukh DS, Pawar VG, Kirpan VG, Khobragade SW, Sarvade k, et al. OrbitalComplications of sinogenic origin: A case study of 20 patients. Word articles in ear, nose, and throat 2010 ;3. www.waent/ archives/ 2010/vol 3-2/10.html.
23. Rashed F, Canon A, Heaton PA, Pual SP. Diagnosis, management and treatment orbital and periorbital cellulitis in children. Emerg Nurse. 2016;24(1):30-35.
24. Singh CSK, James SCE, Sabarigirish CK, Sawami WH, Sood MT. BilateraL orbital complications of pediatric rhinosinositis. MJAFI. 2014;70:68-72.
25. Chaiyate S, Fooanant S, Navacharoen N, Roongrotwattanasiri K, Pongsakom T, Patumanond J. Complications of sinusitis in a tertiary Care Hospital: types, patients Characteristics and outcomes. Int J Otolaryngol. 2015 feb 2 doi.10 - 1155/2015/709302.

26. Wan Y, Shi G, Wang H. Treatment of orbital complication following acute rhinosinusitis in children. Balkan Med J. 2016;33(4):401-406.
27. Adeoti CO, Adejumo OO, Isawumi MA, Kolawole OO, Haastrup AA. Orbital cellulitis in a tertiary institution. Niger J Ophthalmol. 2017;25:141-145.
28. Ben Mabrouk K, Wannes S, Hasnaoui M, Werdani A, Ben Hamida N, Jebri S, etal. U Orbital complication of acute ethmoiditis: Tunisian pediatric cross section study. Am J Otolaryngol. 2020;41: 103.320.http://doi.org/o.1016/J.amjoto.2019.102320
29. Mohamad ZS , Cyrus CR, Kunal S P, Todd J W, Rao VC, Elisa A L, Jonathan YT. Orbital complications of acute sinusitis in pediatric patients: management of Chandler 111 patients. Allergyand rhinology. 2022;13:1-9.