

Incidental Para-Nasal Polyps on Brain MRI Images in a Cameroonian Population

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Abstract

Rationale: Paranasal polyp is a soft tissue pear-shaped mass seen in the sinuses around the nostril. Allergy and inflammations are the major implicating factors. Small polyps could be of no concern to patients but large size could be a disturbance with perennial nasal obstruction and rhinorrhea. MRI with its superlative soft tissue contrast and multi-planarity facilitates the detection of paranasal polyps in brain MRI even when the referral is un-related to otorhinolaryngological features. **Objective:** To evaluate the prevalence and regional localisation of incidental polyps seen in brain MRI. **Design and equipments:** Prospective pioneer study using 0.3Tesla Hitachi AIRIS 11 MRI equipment. **Setting:** Polyclinic Bonanjo, Douala, Cameroon, a Specialist Hospital. **Patients:** 103 Patients referred for brain MRI from June 2009- Jan 2010 with only neurological symptomatology. **Main outcome measured:** Paranasal sinus was evaluated for polyps using T1W, T2W, FLAIR in different acquisitions. **Results:** 103 Patients were studied, 20 Patients had paranasal polyps with 14 (70%) males and 6 (30%) females forming a ratio of 2.33:1. Peak age range was 20-29years with 7 polyps (30%) followed by 50-59years with 25%. Polyps were rare in extremes of age. These 20 patients had 23 polyps due to 2 cases of bilateral maxillary polyps and single case of multiple polyps. The highest number of paranasal polyps 17 (73.91%) were in the maxillary sinus, followed by sphenoidal and frontal sinuses. Majority of polyps were pedunculated and < 2cm. **Conclusion:** Paranasal polyps are easily detected by MRI. The highest location is in the maxillary sinus with male preponderance.

Keywords: Polyps, MRI, Paranasal sinus

1. Introduction

Paranasal sinuses are the 4 pairs of air containing cavities located around the nostrils. This consists of frontal, maxillary, ethmoidal and sphenoidal sinuses. Paranasal sinuses (PNS) play roles in humidifying inhaled air and reducing the weight of skull, though accurate function of paranasal sinuses is still unclear. PNS polyps are abnormal fleshy outgrowths from the mucosa of paranasal sinuses, usually inflammatory.

Though plain radiography is still the commonest tool to investigate PNS, but the sectional images of CT and MRI are more sensitive in yielding PNS polyps. CT has the advantage in demonstrating bony abnormalities while MRI has good soft tissue contrast. This enables polypoidal masses in PNS to be detected as an incidentalomas in patients who were referred for brain MRI studies for problems un-related to ear, nose, throat (ENT).

2. Aim

To investigate the prevalence of incidental Paranasal polyps shown on brain MRI scans performed primarily for neurological reasons

3. Material and methods

Prospective consecutive study of 103 patients who were referred for brain MRI in Polyclinic Bonanjo, Douala from June 2009 to January 2010 was done. The scans were done with 0.3Tesla HITACHI AIRIS 11 MRI

machine. Technical factors used were T1W, T2W and FLAIR. Important acquisitions were coronal, axial and sagittal. Regional localisation was done using sagittal and coronal acquisitions as screening tool. Enhanced images with Gadolinium pentetate dimeglumine were also used in evaluations.

Inclusion criterion is referral for neurological signs and symptoms. Exclusion criteria are referrals related to ENT. Mucosal retention cysts were excluded because they are T1W and T2W hyperintense. Differentiating them from this is in contrast to polyps that are intermediate on T1W and hyperintense on T2W.

Statistical analysis was done using SPSS 13.0 software

4. Results

Of the 103 patients studied, 59 were males and 44 females. Age range was 16 to 81 years, mean age 48.5 years. In all, 20 patients constituting 19.41% of studied population had PNS polyps in one or more PNS. Peak age range was 20-25years with 30% followed by 50-59years with 25%,. Polyps were seen to be rare in extremes of age.

Of the 20 patients with polyps, 14 (70%) were males and 6 (30%) females, with male to female ratio of 2.33: 1. These 20 patients had total number of 23 PNS polyps, with the highest number of 17 polyps (73.91%) located in the maxillary sinuses, and the least 2 (8.78%) located in the frontal sinuses. Sphenoidal polyps were 4 (17.39%) and no ethmoidal polyp was seen. Male-female ratio of 3.25:1 was seen in maxillary sinus polyps, 2:0 in frontal sinus polyps and 1; 1 in sphenoidal sinus polyps. Polyps less than 2cm in greatest diameter were 17 (72.72%) and 2-5cm polyps were 6 (27.28%). 2 patients had bilateral maxillary polyps while 1 patient had multiple polyps. Sessile polyps with broad base were 4 (17.4%), the rest 82.6% were pedunculated.

13 males (76.47%) and 4 females (23.53%) had, maxillary polyps with male to female ratio of 3.25:1. Right maxillary polyps were 11 (64.70%) and 6 (35.30%) were left with ratio 1.33:1, the highest incidence of 7 cases were seen at 20-29years, followed by 50-59years with 4 cases. Maxillary polyps in this study commonly arose from the floor (5 polyps), followed by 3 polyps each from the roof, medial and lateral walls. Bilateral maxillary polyps were seen in 2 patients who were 21year-old male and 22year-old-female. 1 case of multiple polyps in a 43year old man with polyposis in left frontal, maxillary and sphenoid sinuses was seen. Polyps associated with rhino-sinusitis were 9, proptosis - 1, retention cyst -1

5. Discussion

Though the symptomatology of paranasal polyps is perennial nasal obstruction, anosmia/ hyposmia, rhinorrhea and sneezing, but many are asymptomatic especially small polyps. MRI allows better differentiations of soft tissue structures within the sinuses. PNS polypoidal masses are readily seen in brain MRI studies with enough information for affirmative regional localization due to MRI multi-planarity.

Nimbkar and Sane in their histochemical study of 70 polyps specimen, concluded that 77.2% were due to allergy and infection while 22.8% were non-allergic in origin. They therefore classified polyps into 5 histological groups namely oedematous polyps, fibrous polyps, glandular or cystic polyps, Angiectatic polyps and mixed types. This is based on its components as argued by different authors. Virchow and his pupils believed polyps are myxomatous tumours, Eggston and Wolff view it as passive mucosal oedema, Anderson and Bing's thought it as proteinaceous exudates while Weisskopf and Burns consider it mucopolysaccharides. Whatever, allergy, infection and inflammations are paramount. The classic triad of symptoms (Samter's triad) exist in patients with aspirin induced bronchial asthma, Aspirin (ASA) sensitivity and chronic rhino-sinusitis with subsequent formation of nasal polyps. This raises nasal /paranasal polyps prevalence up to 70% in ASA-intolerant patients unlike 4% of nasal polyps in normal populace. Infective origin of paranasal polyps like invasive aspergillosis involving multiple PNS have been reported by Agarwal, et al.

In our study, the majority of the polyps were single and predominantly maxillary. Individual polyps could be antral, choanal polyp, a benign massive polyp or any benign or malignant tumour. In general, multiple benign polyps are seen in Bronchial Asthma, Cystic fibrosis (CF), Allergic Rhinitis, Allergic fungal sinusitis (AFS), Chronic Rhino-sinusitis, ASA intolerance, Alcohol intolerance, Cilillary Dyskinesia, Kartagener's Syndrome, Churg - Strauss Syndrome, Young Syndrome (chronic sinusitis, nasal polyposis, Azospermia), Non-allergic rhinitis with eosinophilia syndrome (NARES). Unlike antro-choanal polyps, sphenchoanal polyps are rare. Choanal polyps are solitary benign tumours arising from one paranasal sinus and pass over drainage ostium of this sinus projecting itself to the choana up to the naso-pharynx.

The prevalence rate of 19.41% in our study agrees with US prevalence range of 0.2-28% with incidence rate among adults of 1-4%. Also male predominance of 2.33:1 agrees with 2-4:1 in adult Americans. No case of PNS polyps was seen in this study in patients below 10years as in other studies where polyps are rare under age 5.

Manifest starts at 20years and common in those older than 40years. The peak age in this study was however 20-29years and followed closely by 50-59years (25%). In our study, small polyps <2cm in maximum diameter predominates with 72.72%. This is advantageous as they are less symptomatic and more responsive to medical treatment like steroids. But the larger polyps though more detectable with anterior rhinoscopy and nasal endoscopy but are more commonly associated with systemic diseases like CF. Jorissen, et al. detected polyps in 56% of CF patients, 17% of them had small polyps while the remaining 39% had larger polyps. Such larger polyps require evaluation with CT and MRI. In this study, majority of the polyps were pedunculated. Differentiations of nasal polyps from mucous retention cyst are usually difficult but the retention cyst is hyperintense on T1W and T2W due to its muco-proteinous content unlike polyp which is T1W intermediate and T2W hyperintense.

PNS polyps are amenable to medical and surgical treatment. Medical treatment is steroid therapy. Surgical management ranges from polypectomy to intranasal ethmoidectomy. But the high recurrence after polypectomy led to development of Functional Endoscopic Sinus Surgery with recurrence reduced to just 10%.

Differential diagnoses of paranasal polyps are Encephaloceles, Glioma, Haemangiomas, Papillomas, Juvenile Nasopharyngeal angiofibroma, Rhabdomyosarcoma, Lymphoma, Neuroblastoma, Sarcoma, Chordoma, Inverting Papilloma, Cystic Fibrosis (CF), Chronic Sinusitis, and Allergic Fungal Sinusitis.

6. Conclusion

The significance of this study are summarised thus:

Paranasal (PNS) polyps are readily evaluated with MRI

PNS polyps in Douala, Cameroon are on the high side of documented prevalence rate of some countries.

The commonest affected sinus is maxillary sinus, followed by sphenoid, frontal and ethmoid sinuses in decreasing order

Pedunculated polyps are more common than sessile polyps

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Table 1.

Studied Population			
Age Range	Male	Female	Total
0-9	1	3	4
10-29	7	4	11
30-39	6	5	11
40-49	8	11	19
50-59	12	11	23
60-69	15	8	23
70-79	6	1	7
80-89	1	1	2
90-99	3	0	3
	0	0	9
Total	59	44	103

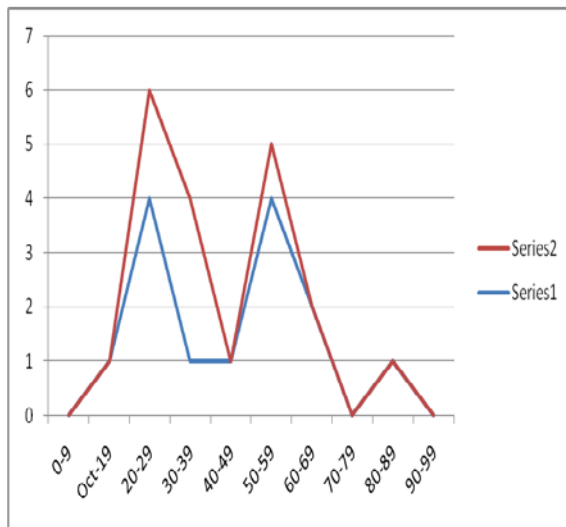


Figure 1. Age -Sex Distribution of Studied Population
Series 1=Females Series 2=Males

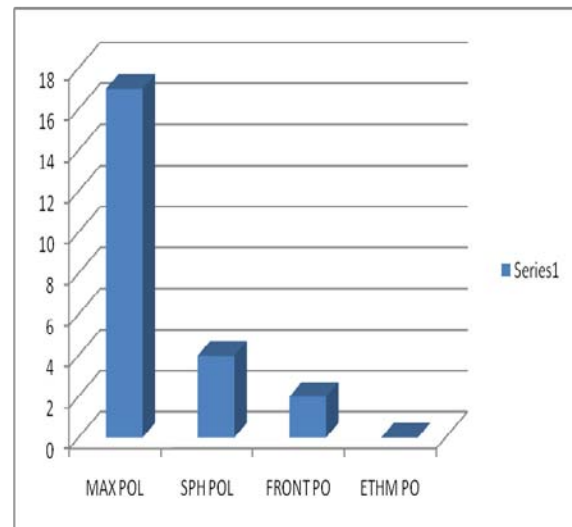
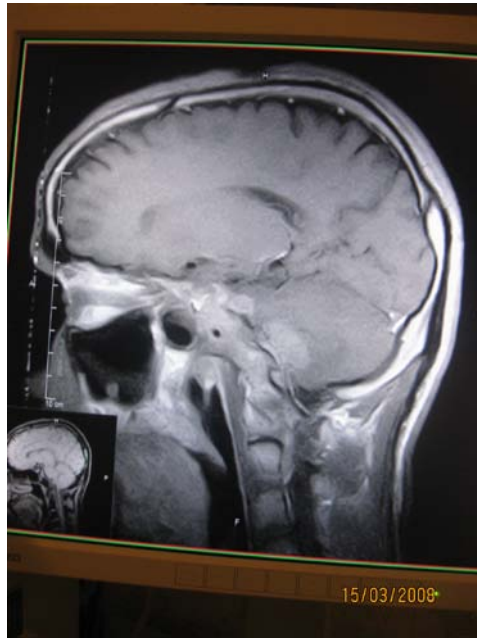


Figure 2. Regional Localisation of Polyps



T1W.



T2W.

Figure 3. showing right maxillary floor polyp