·Clinical Research·

Angiographic characteristics of central serous chorioretinopathy in an Egyptian population

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Abstract

• **AIM: To describe and analyze the demographic characteristics and to determine the angiographic features of acute central serous chorioretinopathy(CSCR) in an Egyptian population.**

• **METHODS: A series of consecutive patients presenting with acute idiopathic CSCR to Mansoura Ophthalmology Center Mansoura University who underwent fluorescein angiography (FA) within a 3 –year –period (between January 1, 2007 and December 31, 2009) was retrospectively studied. Patient demographics and angiographic features were studied. Results were compared to those of other Western and Asian populations.**

• **RESULTS: Fluorescein angiograms of 86 patients were analyzed. 91% were males. The age range of patients was 24 –49 years, with a mean age of (38±6) years. The right eye was the presenting eye in 47% of patients. Eighty–seven percent of eyes showed delayed choroidal filling. Thirty–five percent of patients had more than one point of leakage. The macula was the most common site of fluorescein leakage seen in 79% of patients. Peripheral leakage was seen in 14% of patients while peripapillary leakage was seen in 12% of patients. The inkblot leakage pattern was found in 53% of patients. The presenting eye had RPE atrophic changes in 84% of cases. The other eye was assessed in 44 patients (51%). Fifty–five percent of them had signs of RPE atrophic changes.**

• **CONCLUSION: In the Egyptian population, CSCR is seen at younger age with higher male–to–female ratio and more frequent smokestack leaks than other populations. Despite younger age group, this series of patient showed higher frequency of bilateral and multifocal disease compared to other studies. Roles of psychological stress and choroidal ischemia in pathogenesis of CSCR need further evaluation.**

• **KEYWORDS:** choroidal circulation; central serous chorioretinopathy; epidemiology; fluorescein angiography; medical retina

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INTRODUCTION

Idiopathic central serous chorioretinopathy (CSCR) is characterized by serous detachment of the neurosensory retina with focal and multifocal areas of leakage at the level of the retinal pigment epithelium (RPE) affecting the macular area mainly. It affects young healthy adults mostly men between 20 and 50 years [1,2]. The disease is usually unilateral. Patients present with blurred central vision, micropsia, metamorphopsia and relative scotoma [3, 4]. Acute episode resolves spontaneously in the majority of patients within 6 months [5]. CSCR has been be associated with Type A personalities [6], emotional distress [7], hypertension, sleep disturbance [8] and corticosteroids [9]. Pathophysiology of the disease is still not fully understood. Features of abnormal choroidal circulation have been reported suggesting that choroidal ischemia might play a role in its pathogenesis[10].

Fundus fluorescein angiography (FA) of CSCR typically shows a focal area of leakage of the dye from the RPE into the subretinal space with two main patterns: "ink blot" or" a smoke-stack" [11]. After resolution of the detachment, all the fluorescein findings may return to normal. However, mottled hyperfluorescence may be present due to pigment loss in long-standing retinal detachment[12]. One or more recurrence, mostly within the first year, occurs in about one half of patients[8, 13, 14].

Patient demographics have been studied in Asian [8, 15] and Western populations [16, 17] but not in Arabic populations to date. The purpose of this study was to describe the demographic characteristics and angiographic features of acute CSCR in an Egyptian population.

SUBJECTS AND METHODS

Subjects A series of consecutive patients presenting with acute idiopathic CSCR to Mansoura Ophthalmology Center Mansoura University who underwent FA within a 3-year-period (between January 1, 2007 and December 31, 2009) was retrospectively studied. The majority of patients belong to the lower middle class Egyptians who can afford visiting a tertiary center but cannot afford visiting a private clinic. The study was approved by the local ethical committee and was carried out in accordance with the

Declaration of Helsinki. Acute idiopathic CSCR was defined as blister-like localized serous detachment occurring in the macular area with angiographic evidence of single or multiple leaks at the level of the RPE without other possible cause such as inflammation, exudation or choroidal neovascularisation, and with signs and symptoms lasting not more than 6 months. Cases with coexisting ocular or macular disease were excluded. Patient demographics and angiographic features were studied.

Methods All angiograms were retrieved from the digital database using the Topcon Imagenet system (TRC 50 IX). A smokestack leakage is the leakage of fluorescein that spreads vertically a linear configuration as the angiogram progresses (Figure 1). An inkblot leakage refers to a small focal hyperfluorescent leak that appears early and increases in size and intensity as the angiogram progresses (Figure 2). Unifocal leakage is used to describe a solitary site of either inkblot or smokestack leakage (Figures 1,2) while multifocal leakage is used when there is more than one site of leakage (Figures 3, 4). The site of leakage will be classified into 3 groups: 1) the macula 2) the peripapillary and 3) the periphery. The macula was defined as the region that coincides with the course of the major temporal blood vessels centered on the fovea with an approximate diameter of 5.5mm, whereas the peripapillary area is that one within 1 disc diameter of the optic nerve, excluding the macula region, and the periphery is the area outside the macula and peripapillary region.

Choroidal filling was considered delayed when a choroidal lobule lacks the background fluorescence till the arteriovenous phase of FA (Figure 5). Presence of RPE atrophic changes seen as focal granular hyperfluorescence indicating window defect was looked for. FA of the fellow eye, if available, was analyzed to determine if there is bilateral disease involvement (Figure 6).

Statistical Analysis Obtained data was analyzed with descriptive statistics. Results were compared to those of other western and Asian populations.

RESULTS

In the 3-year-period, 86 patients met the inclusion criteria. The majority of them were males (78/86) (91%). Male-to-female ratio was 9.75:1. The age range of patients was 24-49 years, with a mean age of (38±6) years. The right eye was the presenting eye in 47% of patients. Seventy-five eyes showed delayed choroidal filling (87%). The inkblot leakage pattern was seen in 46 (53%) of eyes. Thirty eyes (35%) patients had multifocal leakage of the dye.

The macula was the most common site of fluorescein leakage seen in 68 eyes (79%). Peripheral leakage was seen in 12 eyes (14%) of patients while peripapillary leakage was the least common site seen in ten eyes (12%). Four eyes had more than one point of leakage in 2 or 3 different sites.

The presenting eye had RPE atrophic changes in 72 eyes (84%). The angiograms of the other eye were available in 44 eyes of the series. Angiographic evidence of bilateral diseases was seen in 24 eyes of them (55%).

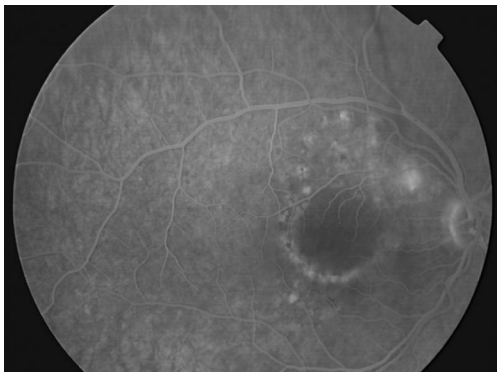

Figure 1 Small ascending single smoke stack leak. The macular area shows focal granular inactive hyperfluorescence indicating previous attack.

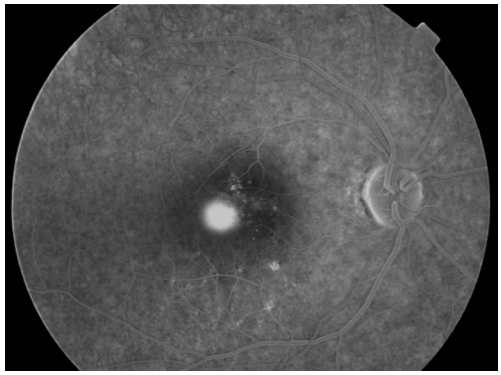

Figure 2 An ink blot leak in the macular area. In addition, the macular area shows focal granular inactive hyperfluorescence indicating previous attack.

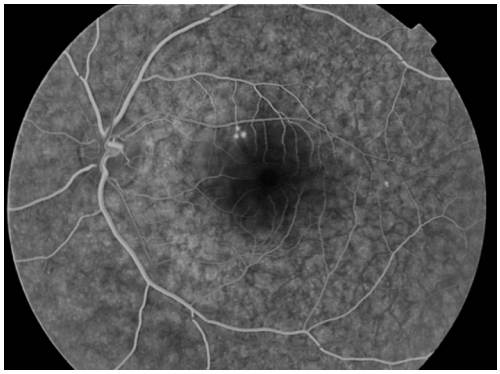

Figure 3 Three adjacent ink blot points of leak in the macular region.

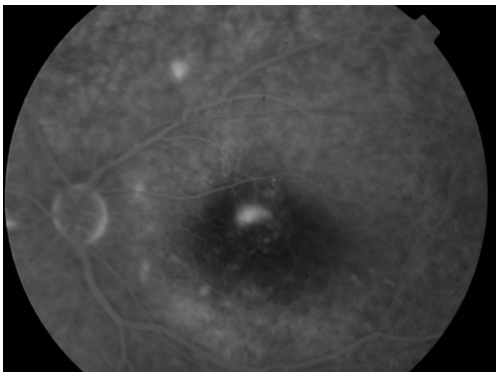

Figure 4 Multiple RPE smoke stack leaks in different regions.

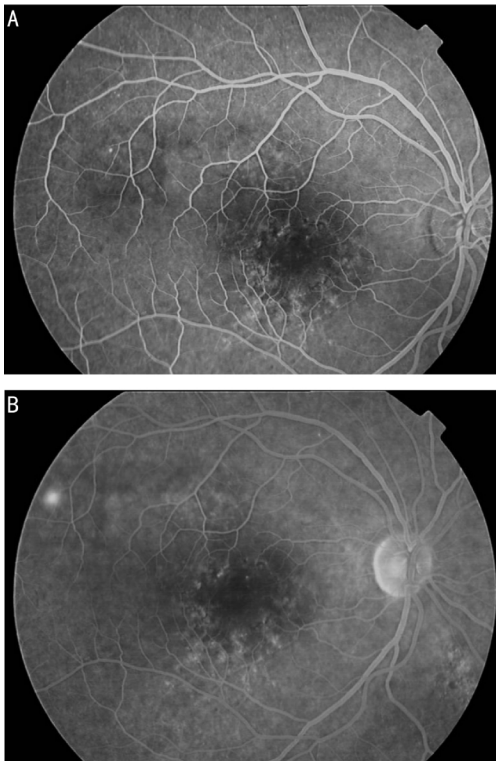

Figure 5 Lack of background fluorescence in one of the choroidal lobules till the retinal arteriovenous filling with an overlying unifocal inkblot point of leak. The macular area shows focal granular inactive hyperfluorescence indicating previous attack A: Early phase; B: late phase.

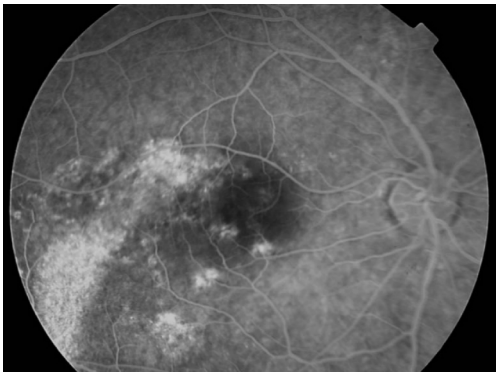

Figure 6 Focal granular inactive hyperfluorescence indicating previous attack in the right eye. The left eye of this patient had ascending single smoke stack leak.

DISCUSSION

Previous studies have described the demographics of patients with CSCR in different populations[8, 15-18]. The unique feature of this study is its entirely new population that was not studied before to the best of the author's knowledge. The patient demographics in the Egyptian population were compared to that reported in other populations. The male-to-female ranged from 2.32:1 to 6:1 in Asian, European and American populations[8,15,18,19]. In the presenting study it was 9.75: 1. There are several possible reasons for this higher rate in the Egyptian populations. Being responsible mainly for financially supporting their families in rural communities like Mansoura where the presenting cases were drawn from, men may be more motivated to seek medical care with the occurrence of the presenting symptoms than women. Another possible reason is related to stress, a suspected risk factor for CSCR [20]. The role of women in the Egyptian society is still much less than western and Asian societies. Egyptian women may be less subjected to stress-related conditions such as CSCR.

Patients with CSCR in this study were younger. The age range of patients was 24 to 49 years, with a mean age of 38 years. The mean of age was 43 years for a European population[19], 41-45.6 years for Asian populations[8,15], and 51 for an American population[16].

The inkblot pattern of leakage was relatively more common than smokestack pattern (53% *vs* 47% respectively). Inkblot pattern was much more common in previous reports ranging from 80% to 93%[10, 15, 19]. The difference may be related to geographic environmental factor, ethnic variations, or age of the patients. Smokestack leakage pattern was 2.5 times greater in the African American than in Caucasians [17]. Studying demography of the smokestack leak pattern in central serous chorioretinopathy revealed that smokestack leaks are more common in acute episode. They usually develop in the early part of the acute phase of the disease[21]. The age group of patients with smokestack leaks is comparable to the age group in this study. Thirty-five percent of cases had multifocal leakage of the dye. Multifocal points of leak were seen in 44% of patient in Asian population[15]. It ranged from 16% to 28% in European and American populations [10, 22, 23]. The macular site was the most common site (79%). This was consistent with findings by other investigators[15].

Seventy-two (84%) of the studied eyes showed inactive pigment epithelium defects in the angiograms as seen after healed central serous retinopathy verifying the tendency of the disease to recur and to be of multifocal nature. Dellaporta[13] reported 81% of pigment epithelium defects in his series.

The angiograms of the other eye were available in 44 eyes of this series. Angiographic evidence of bilateral diseases was seen in 24 eyes of them (55%). Evidence of bilateral disease was reported in a range of 6 to 51% of cases[13,15, 24].

In the present study, delayed choroidal filling was seen in 87% of the cases. Reports of ICG angiography in cases of CSCR described delayed arterial filling of the choroid. These filling delays persisted till the dye filled the retinal veins. The primary cause of CSCR was hypothesized to be occlusion of the choriocapillaris. Choroidal blood flow in the center of the fovea was significantly lower in affected eyes than in the fellow eye [25]. Hypoperfusion and ischemia were found to be the basal characteristics of retrobulbar blood vessels circulation in cases of CSCR[26].

In the Egyptian population, CSCR is seen at younger age with higher male-to-female ratio and more frequent smokestack leaks than other populations. Despite younger age group, this series of patient showed higher frequency of

bilateral and multifocal disease compared to other studies. The difference may be related to the underlying pathogenic mechanism or a higher susceptibility of Egyptians to CSCR.

During that 3-year-period, Egyptians were under economic and political stress that was a major drive to January revolution. Psychosocial factors were suggested to have dominant role in the etiology of CSCR. Stress was suggested to have a role in CSCR. A very disturbing psychological event preceded the loss of vision in 91% of the cases [20]. After the beginning of the Ivorian political-military crisis, six cases of CSCR were observed over a period of 2 years in one center in Abidjan. No single case was reported in the same center in the same time period before the crisis [27]. Experimental models of CSCR have been produced in rabbits and monkeys after intravenous injection of adrenaline supporting the fact that stress plays a role in causing the disease [28, 29]. Caccavale *et al* [30] suggested a pathogenetic model with a cascade of events producing CSCR. Increased reactivity of pituitary-hypothalamic axis response, caused by chronic psychological distress for example, will lead to relative hypercortisolism causing reduced choroidal flow and lobular choriocapillaris hypoperfusion. Finally RPE decompensation and detachment occurs causing CSCR.

There are some limitations to this study; this series involved a retrospective review of only patients who underwent fluorescein angiography. However, the results of the presenting study provide a useful basis for a more comprehensive prospective study of this common condition in the Egyptian population. Roles of psychological stress and choroidal ischemia in pathogenesis of CSCR need further evaluation.

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