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RESEARCH ARTICLE

ACUTE CORNEAL HYDROPS - A RARE POSSIBLE NIGHTMARE IN PREGNANCY

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ABSTRACT

Keratoconus is a non – inflammatory ectatic condition of cornea that usually manifest during puberty. There is a progressive thinning of cornea leading to conical protrusion which induces irregular astigmatism resulting in visual impairment. Acute corneal hydrops is the development of marked corneal edema due to tear in the descemet's membrane followed by leakage of aqueous into the stroma. ACH is a well-known complication occurring in approximately 3% of patients in keratoconus. Hormonal changes during pregnancy may have a negative impact on corneal biomechanics therefore indicating the pregnancy may be previously recognised risk factor for keratoconus. A high number of reports from eye clinics show pregnancy induced exacerbation of keratoconus. We present a case of 27 yrs. female with bilateral keratoconus. She presented to us with acute corneal hydrops in left eye and early keratoconus in the right eye at 34 th week of gestation

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INTRODUCTION

Keratoconus, a non-inflammatory ectatic condition of the cornea, manifest during puberty in most cases bilaterally. It has an incidence of 1 in 2000 among general population causing irregular astigmatism. Again pregnancy is the physiological state when the female body confronts major hormonal imbalance. Pregnancy induced adverse biomechanical alterations of cornea deteriorating the pre-existing ectatic condition has been validated in several studies which is quite rare as compared to general population. Juliana Gliceria *et al*. have reported a case which was first one in the Brazil and third one in the world to be substantiated by the year of 2013 attesting pregnancy induced progression of keratoconus as a rare phenomenon (Glicéria, 2013). So presently, vanguard research is focused on the influence of hormones on corneal biomechanical properties (Florence, 2013). Detection of keratoconus during puberty and progression during pregnancy probably suggests the hormonal system involvement (Lahoud, 1987).

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Hormonal alterations during pregnancy may result in adverse corneal biomechanics, implying pregnancy to be an unrecognized risk factor for worsening of keratoconus (Lahoud, 1987). Brown stein *et al*. have reported a case with bilateral keratoconus who developed corneal perforation late in the pregnancy. The author implies pregnancy to be a possible underlying cause in the development of perforation although this finding is incidental (Lahoud, 1987).

Case Report

A 27- years- old non- diabetic and normotensive female in good health at the 34th week of gestation and no ophthalmological history in non-pregnant state presented to our centre with the 8 days history of gross loss vision for all distance in her left eye (OS). It was accompanied with pain, photophobia and watering (Fig.1). She documented the initiation of the only symptom of defective vision, when she was continuing her 20th week of gestation. She was unaware of any refractive error. She deliberately rubbed her left eye following mild itching and landed upon the above mentioned symptom. There was no history of any ocular allergy, trauma, and contact lens use. Her vitals, routine blood investigations

and thyroid function tests were evaluated to be within normal limit. The best corrected visual acuity in the left eye (OS) deteriorated to 2/60 and with pinhole there was no improvement. The gross examination of her left eye exhibited Munson's sign (Fig.2) and Rizzuti sign (Fig.3). The bio-microscopic examination divulged a protruded, oedematous, steep zone of size 4x4 mm present in the inferotemporal region of cornea with significant obscuration of pupillary margin along with descemet's fold (Fig.4). On retinoscopy, no red glow was revealed and post. segment examination could not be done because of haziness of media. Keratometric evaluation displayed distortion of mires. A maximal keratometric value (K –max) of 55.0 D was observed in the left eye by Scheimpflug imaging technique with a thickness of 399 micrometres in the thinnest region (Fig 5 & 6).

Similarly, the best corrected visual acuity in her right eye (OD) was 6 / 60 with pinhole 6/ 24. Retinoscopy displayed scissor reflex. The gross and bio microscopic examination of her right eye and fundoscopic examination were within normal limit. Scheimpflug imaging technique revealed the maximum keratometric value (K – max) of 47.8. The thinnest area was 440 micrometres thick (Fig.7). With these above findings, she was provisionally diagnosed with acute corneal hydrops (OS) and early keratoconus (OD). She was advised with topical steroid drops, hypertonic saline drops and lubricating drops and was followed up 2 months later in her 8th week of postpartum period. The maximum keratometric value (K- max) showed an improvement of 1.00D OD and K- max (OS) was stabilized.

Fig.1. A pregnant lady with visual complaint

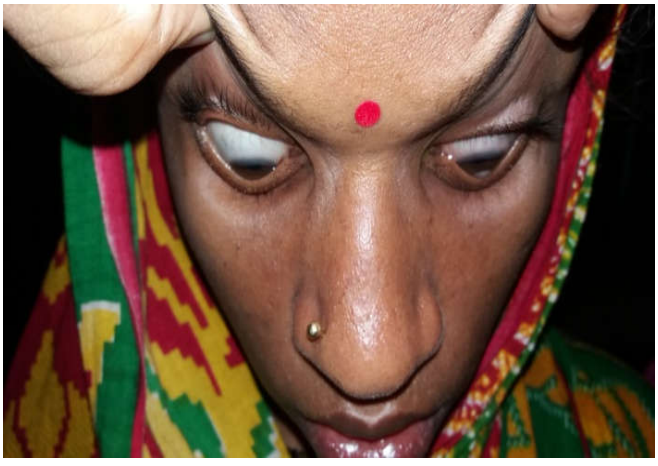

Fig.2. Munson's sign

Fig.3. Rizzuti sign

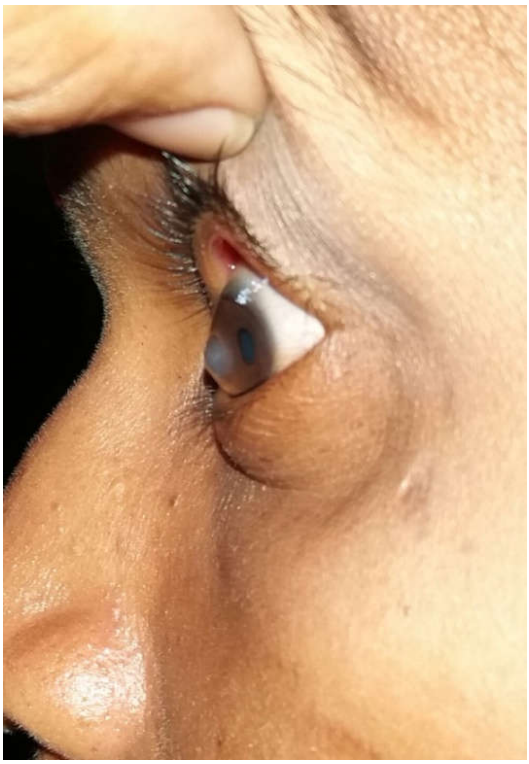

Fig.4. Keratoconus of left eye

DISCUSSION

Refractive alterations as evidenced by increased rate of contact lens intolerance during pregnancy due to increased corneal steepness and decreased corneal sensitivity have been reported by Park *et al*. during the last trimester of pregnancy. In our case there was gross decline in the visual acuity which can be attributable to keratoconic astigmatism in the early state and later to oedematous hydrops. Recent experimental studies have revealed the presence of estrogen receptors in cornea and established significant stiffness reducing impact of estrogen on it. These outcomes indicate that high estrogen level in pregnancy may make the biomechanically weak corneas susceptible to develop ectasia like in our case (Glicéria, 2013). Again the pregnancy hormone, RELAXIN, discovered by Hisaw in the year of 1926 (Glicéria2013), reaches its peak level at about 14th week of gestation and is maintained at the same for rest part of pregnancy. The upregulation of MMP-1, MMP-2 and MMP-9 in the corneal stroma is significantly increased, so also the downregulation of tissue inhibitor of MMP-1 in keratoconic corne (Maharana, 2013 and Glicéria, 2013). The initial development of diminished visual acuity at

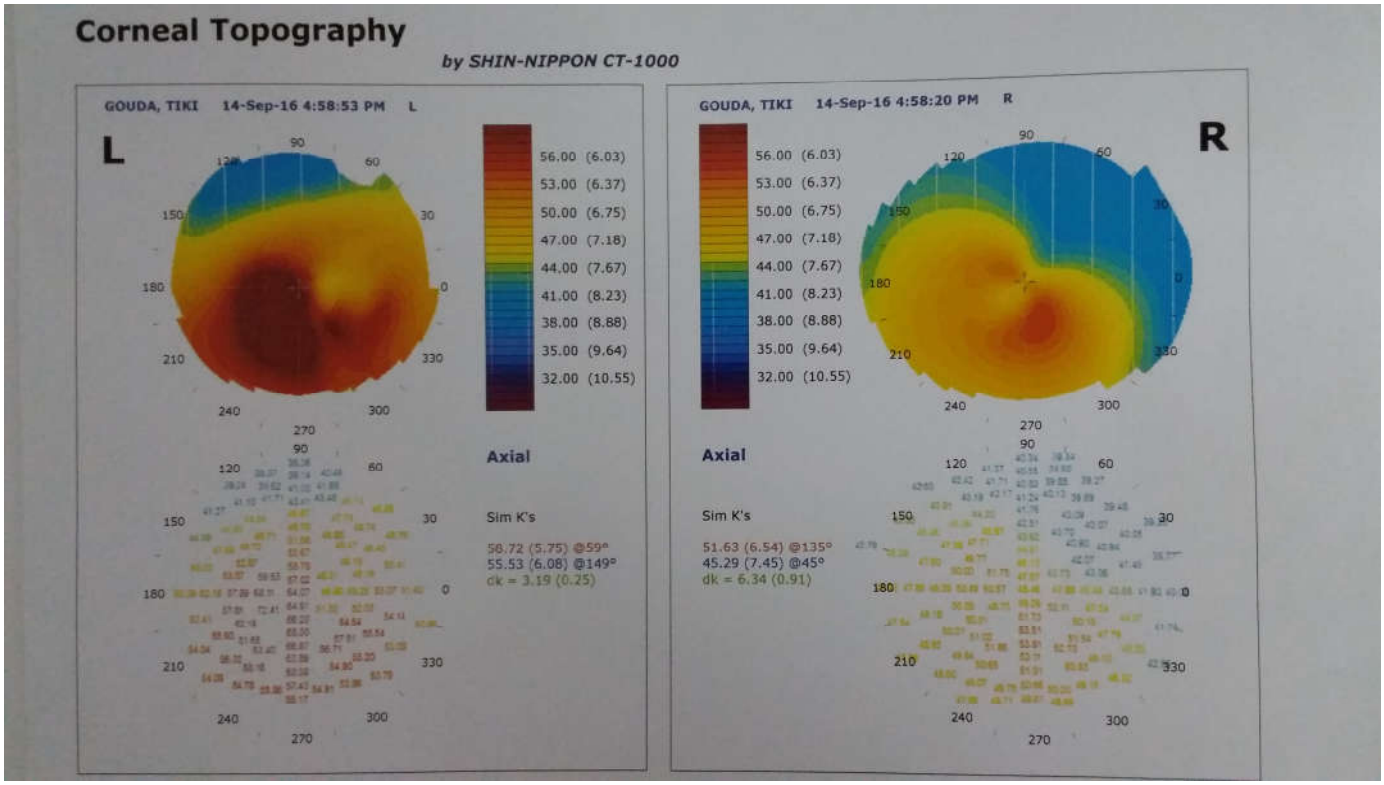

Fig.5. Corneal topography image of both the eyes

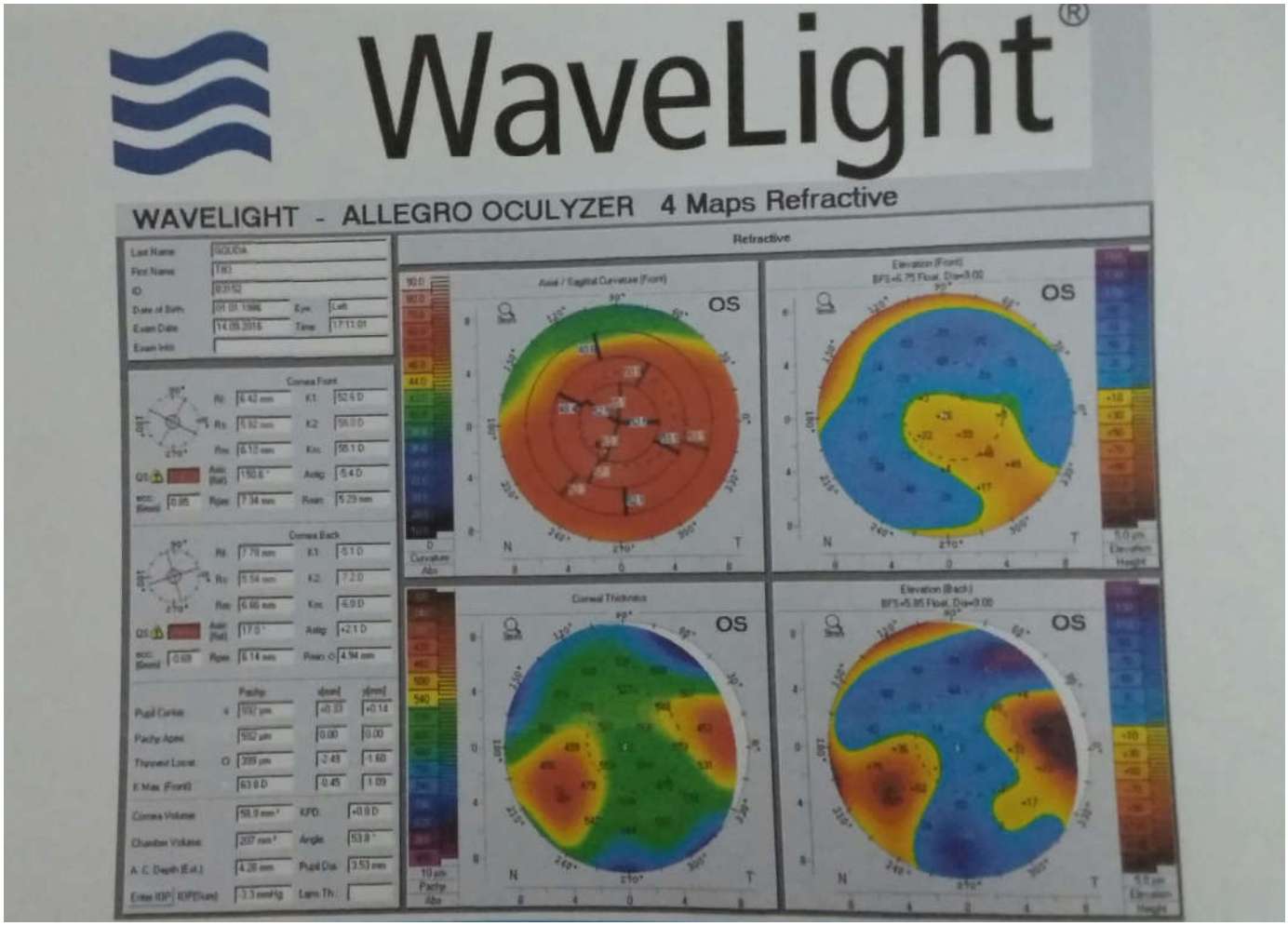

Fig.6. Scheimpflug imaging of left eye

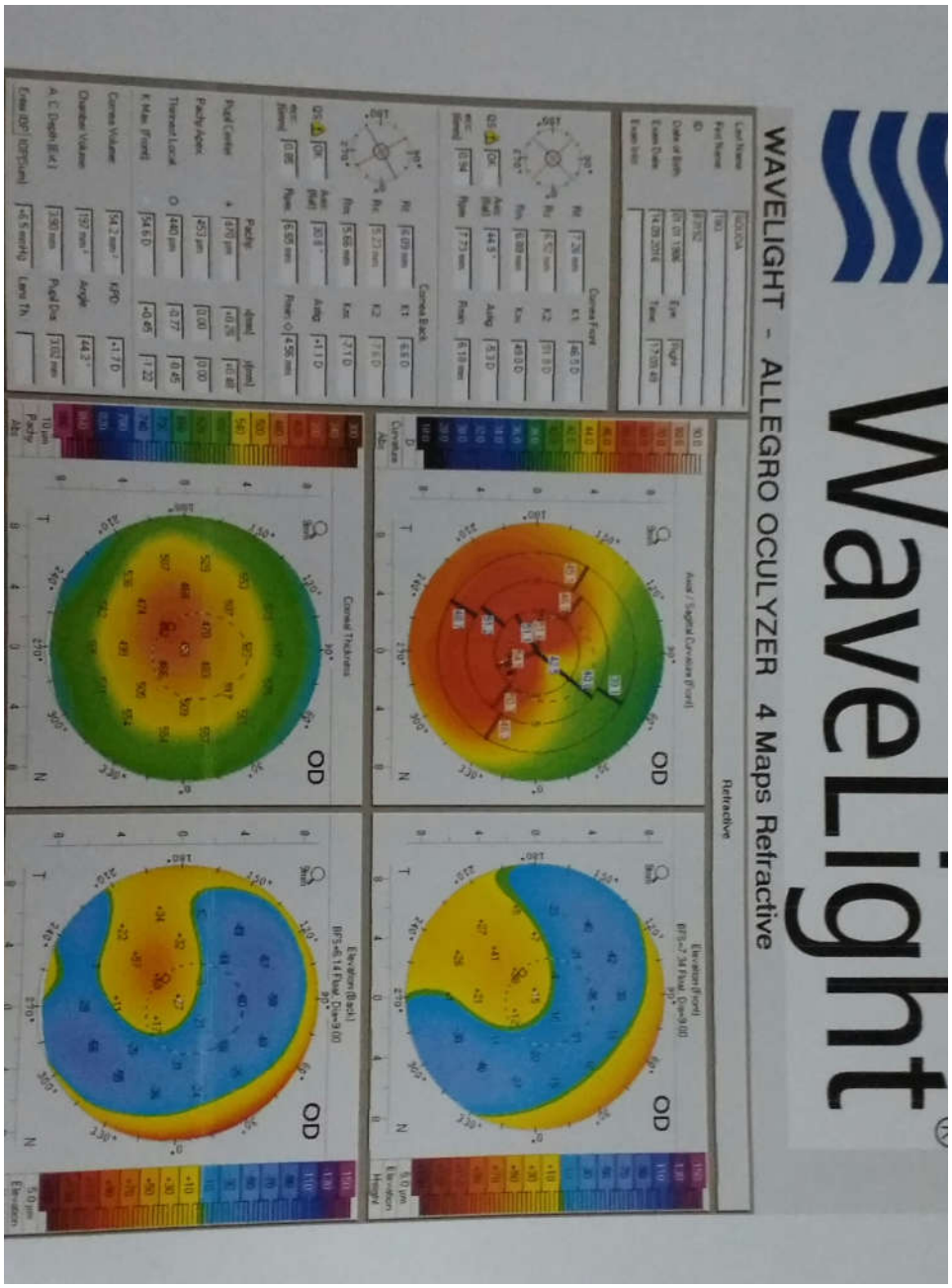

Fig.7. Scheimpflug imaging of right eye

20th week of gestation, possibly due to keratoconic astigmatism can be well corroborated to this study. Such type of hormonal fluctuation can be accounted for progressive aggravation of symptoms in last half of gestation and then symptomatic and keratometric stabilisation in the postpartum period when the hormones return to their prepregnancy state. On the other hand, MMPs play a pivotal role in the embryo implantation controlling the trophoblastic invasion during pregnancy. Human Chorionic Gonadotropin (HCG) induces upregulation of MMP by the trophoblasts (especially MMP-9) in the first trimester. The ovarian extracellular matrix remodelling mediated by MMP and required for the establishment of pregnancy resembles the pattern of MMP expression in corneal extracellular matrix in keratoconus (Maharana, 2013 and Glicéria, 2013). Experimental studies have also demonstrated elevated levels of cathepsins V/L2, -B, -G being responsible for matrix degradation, occurring in keratoconic corneal stroma. Gatzioufus and Thanos have reported a case of hypothyroxinemia induced acute corneal hydrops during pregnancy (Gatzioufas, 2008). But in our case, the thyroid profile was absolutely normal. Farhad Hafezi has mentioned that regular gestational hormonal changes, in spite of exacerbating keratoconus, have only transient and fully reversible impact (Florence, 2013).

Conclusion: Pregnancy induced hormonal imbalance can exert its adverse effect on cornea both physically and physiologically. However such a correlation requires more studies and investigation to establish its foothold and for the denial of it as an incidental finding. Also the changes are short-lived and may regress back as the effect of the hormones passes away. Therefore conservative management should be provided with the first priority whenever pregnancy induced aggravation is encountered.

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