Conjunctivochalasis

Essay
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List of Abbreviations

AMT	Amniotic membrane transplantation
BUT	Break up time
CCh	Conjunctivochalasis
Conj.	Conjunctiva
DG	Down gaze
DP	Digital pressure
FCT	Fluorescein clearance test
FNLDO	Functional nasolacrimal duct obstructions
HEL	Hexanoyl-lysine
HEMA	Hydroxyethyl methacrylate
KCS	Kerato conjunctivitis sicca
LIPCOF	Lid–parallel conjunctival folds
MMPs	Matrix metallo protenase
NCCh	Nasal conjunctivochalasis
NLD	Naso lacrimal duct
OCP	Ocular cicatricial pemphigoid
OSDI	Ocular Surface Disease Index
PANDO	Primary acquired nasolacrimal duct obstruction
PPC	Paste-pinch-cut conjnuctivoplasty
RB	Rose Bengal
SLK	Superior limbic kerato-conjunctivitis
SPK	Superficial punctuate keratopathy
SS	Sjogren syndrome
TCT	Tasting chloromycetin test

What is Conjunctivochalasis?

Conjunctivochalasis (CCh) is described as a redundant, loose, non-edematous inferior bulbar conjunctiva interposed between the globe and the lower eyelid. The condition tends to be bilateral and can be localized in the medial, central, or lateral part of the lower eyelid[(1)].

The term conjunctivochalasis, taken from the Greek term meaning “relaxation of conjunctiva,” was first coined by Hughes in 1942[(2)].

This subtle redundancy which is a few millimeters below the inferior limbus may not be easily detected when the patient maintains primary or upgaze but is accentuated when he is moving his eyes from primary gaze to down gaze.

Unlike the generalized "boggy" conjunctiva seen in allergic conditions this localized redundancy is not responsive to treatment with antihistaminics or steroids[(3)].

Although conjunctivochalasis has been reported in a 15-year-old patient[(4)], it is more prevalent in older people[(2),(3),(5)].

As a result, conjunctivochalasis is often regarded as a normal aging variation, and its clinical significance is not clear and may be overlooked[(6)].

Symptoms:

Although conjunctivochalasis may be asymptomatic, various clinical problems may develop according to its severity. Clinical effects range from contributing to or aggravating an unstable tear film leading to dry eye sensation & irritation at the mild stage, to impeding the tear outflow either by interference of the inferior tear meniscus by the redundant conj. or by occlusion of the inf. Punctum by the redundant nasal conj. Which is lees common than the first mechanism that cause intermittent but not constant tearing at the moderate stage "epiphora"[(3),(7)] to inducing ocular surface exposure symptoms at the severe stage that was described by Hughes namely: pain, marginal corneal ulcer and subconjunctival hemorrhage[(2)].

The pain tends to be sudden, sharp and intermittent was agrrevated by downgaze and was thaught to be derived from the compression of the redundant conj. during lid blinking or closure. The marginal corneal ulcer was presumably caused by Dellen formation. The subconjunctival hemorrhage might well be caused by mechanical rubbing on a chronically inflamed and fragile tissue.

These findings are relatively uncommon in current practice, but it was speculated that the symptoms at the advanced and severe stage described early were caused by exposure problems. This would explain why the most frequently recommended medical treatment then was frequent lubrication and patching at nighttime to eliminate nocturnal exposure[(1)].

Symptoms are often made worse by vigorous blinking[8].

Thus, conjunctivochalasis can complicate our diagnostic understanding of patients suffering from ocular irritation. For this reason, it was important to establish an objective and reliable system for grading conjunctivochalasis. The LIPCOF (lid–parallel conjunctival folds) classification which was proposed by Höh[9].

Is based on the number of folds and the height of the redundant conjunctiva with respect to that of the tear meniscus and was modified by Meller[1].

Table (1): Grading of Conjuctivohalasis by LIPCOF*[9].

Grade	Number of folds and relationship to tear meniscus height
0	No persistent fold
1	Single, small fold
2	Mort than two folds and not higher than the tear meniscus
3	Multiple folds and higher than the tear meniscus

However, the location of the redundant conjunctiva on the lower lid varies, and the size of the conjunctival fold can be increased by downgaze[6] or digital compression onto the globe[2].

In mild conjunctivochalasis the redundant folds can be better appreciated when the eye is moved from abduction to adduction. In advanced conjunctivochalasis, the folds may overlap the inferior limbus and cornea[2],[7].

Therefore, Meller and Tseng proposed a more complete grading system to include the extension of conjunctivochalasis and gaze-dependent changes. Digital pressure is included as a factor in estimating the extent of severity, because some patients with conjunctivochalasis might have had a lid-tightening procedure, which could generate more pressure and worsen conjunctivochalasis[1].

Table (2): Proposed new Grading system for conjunctivochalasis*

Location	Folds versus Tear Meniscus Height	Punctual Occlusion	Changes in Downgaze	Changes by Digital Pressure
0 1 2 3	A B C	O+ O--	G⇑ G⇔ G⇓	P⇑ P⇔ P⇓
0: none 1: one location 2: two locations 3: whole lid	A: < tear meniscus B: = tear meniscus C: > tear meniscus	O+= nasal location with punctual occlusion O-- = nasal location without punctual occlusion	G⇑= height/extent of chalasis increases in downgaze G⇔= no difference G⇓= height/extent of chalasis decreases in downgaze	P⇑= height/extent of chalasis increases on digital pressure P⇔= no difference P⇓= height/extent of chalasis decreases on digital pressure

*The new grading system defines the extension of redundant conjunctiva as grade 1 = one location, 2 = 2 locations, 3 = whole lid. For 1 and 2, it is further specified as T, M, and N if conjunctivochalasis is found in the temporal, the middle (or inferior to the limbus), and the nasal aspect of the lower lid, respectively. For each location (T, M, and N), further notation is given to indicate if the height of folds is less than (A), equal to (B), or greater than (C) the tear meniscus height. If it is found in the nasal (N) location, the extent of chalasis is further determined as to whether it occludes the inferior puncta. For each location, it is further graded as G⇑ if its height is greater than, as G⇔ if equal to, and as G⇓ if less than the tear meniscus height. Likewise it is further graded as P⇑, P⇔, and P⇓ if it is worse, no difference, or better with digital pressure (P), respectively.

Hypothetical Pathophysiology:

The underlying cause of conjunctivochalasis was unknown. But Hughes considered the formation of conjunctival folds as a senile change[2].

Pathologic data were scanty and conflicting. Degeneration of elastic fibers has been noted but no fragmentation or other abnormality of the elastic fibers was observed with use of hematoxylin and eosin and Wright elastic-tissue stain.

Detailed histologic and immunohistochemical studies were needed, because elastotic degeneration is known to be a feature of pingueculae, pterygium and photoaged skin. Elastotic degenerationis thought to be caused by actinic damage. Which was also found to be associated with conjunctivochalasis. The clinical sign of redundant tissue suggests that a collagenolytic activity may contribute to the pathologic process of conjunctivochalasis.

This hypothesis is strengthened by the presence of ocular surface inflammation. It was thaught that if, indeed, elastotic degeneration is the main histopathologic feature, one would predict that collagenolytic action is linked with elastotic degeneration. This association is suggested in other ocular surface disorders, such as pterygium and pingueculae[10].

Alternatively, both elastotic changes and collagenolysis might independently contribute to the formation of conjunctivochalasis Regaurd the nature and the source of the degrading enzyme(s) which was a questionable issue, the

preferential involvement of the inferior bulbar conjunctiva and lid margin strongly suggests that the insult leading to the elaboration of the degrading enzyme is derived from tears accumulated in the inferior fornix and the tear meniscus. In this regard, it is worth noting that Liu did not observe any outflow obstruction by Jones 1 and 2 tests, leading him to conclude that tearing resulted from obstruction by redundant conjunctiva and not from anatomic obstruction in the nasolacrimal passage (Figure 1)[3].

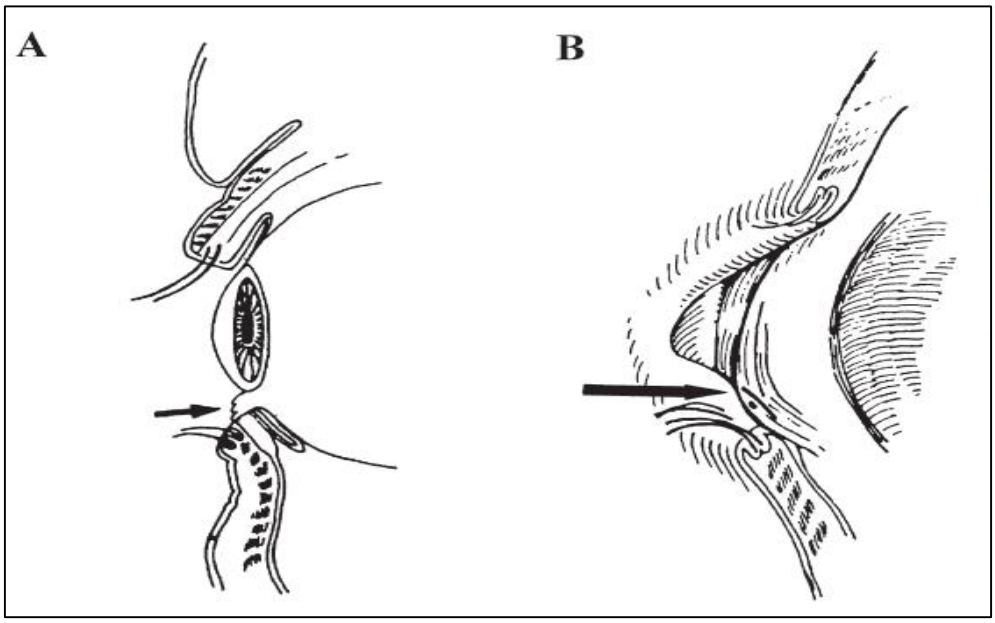

Figure (1): Schematic drawing of proposed mechanisms by which Conjunctivochalasis may cause tearing two mechanisms has been proposed. **(A)** Interference of the inferior tear meniscus by an arrow. **(B)** Occlusion of the inferior punctum (indicated by an arrow) by the redundant conjunctiva (drawn as superimposed transparent tissue over the punctum). Drawings are modified from Liu with the permission of the author and ophthalmic plastic and reconstructive surgery[3].

However, Jordan and Pelletier, using a dye disappearance test, noted retention of fluorescein in a patient with conjunctivochalasis, suggesting that there is functional block of the outflow system[6].

Other studies are needed to determine if there is preexisting delayed tear clearance that leads to the accumulation of degrading enzyme(s). If so, this may explain how inflammation can be causatively linked with development of delayed tear clearance, which in turn can then be linked with formation of conjunctivochalasis. Evidence was provided that delayed tear clearance establishes a vicious cycle, leading to ocular irritation[11].

It was speculated that conjunctivochalasis may be another cause of delayed tear clearance, which in turn causes an increase of collagenolytic activity. This hypothesis is diagrammed in Figure (2).

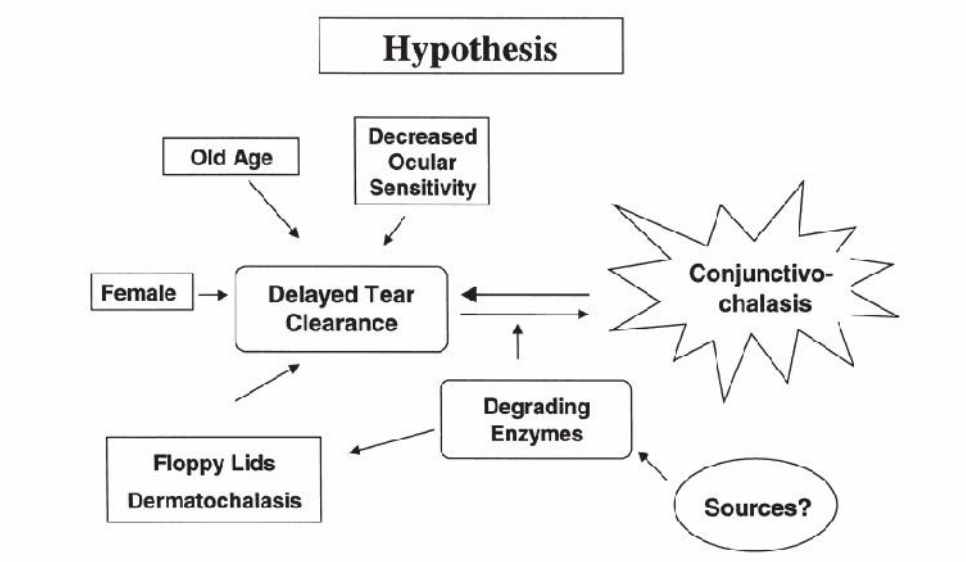

Figure (2): The hypothetical pathology of Conjunctivochalasis. One possible mechanism to from Conjunctivochalasis is via accumulation of grading enzymes in the tears as a result of delayed tear clearance, which is associated which such factors as old age, female sex, decreased ocular sensitivity, Dermatochalasis, and floppy eyelids. Once established, delayed tear clearance. Future research is needed to determine if indeed this hypothesis is accurate[9].

The most intriguing and unresolved questions regard the relationship of conjunctivochalasis to dry eye. Because the severity of conjunctivochalasis has a high predictive value in diagnosing KCS[9].

They speculated that conjunctivochalasis is commonly found in patients with an unstable tear film. This notion is augmented by the finding that dermatochalasis, a condition frequently associated with conjunctivochalasis, is also known to be associated with dry eye. Such a strong association may be attributed to the fact that conjunctivochalasis aggravates an

unstable tear film by disrupting the formation of inferior tear meniscus, a mechanism proposed by Liu[3].

Furthermore, the unstable tear film noted in conjunctivochalasis might not be caused by aqueous tear deficiency, but instead by lipid tear deficiency; this is suggested by the non exposure- zone staining pattern, a finding reported to be associated with this form of tear deficiency[12].

Another possible cause is delayed tear clearance, which is also found to have the non exposure-zone staining pattern[11].

Although obstruction of tear outflow at the inferior punctum can be caused by nasally located Conjunctivochalasis, one cannot exclude the possibility that redundant conjunctiva impedes the tear outflow to the inferior punctum even without frank occlusion. These two mechanisms can lead to delayed tear clearance. However, we also cannot rule out the pre-existence of delayed tear clearance before the development of Conjunctivochalasis. Collectively, delayed tear clearance would explain how “episodic tearing” can develop by reflex tearing triggered by an unstable tear film, even if there is no frank obstruction by conjunctivochalasis[1].

In general, conjunctivochalasis was thought to be devoid of inflammatory signs, and fluorescein or rose bengal staining tends to be negative. However, a discrete punctate or linear staining can be seen on the mucosal aspect of the lid margin adjacent to the redundant conjunctiva, the redundant bulbar conjunctiva, and the adjacent lid margin and tarsal conjunctiva (Figure 3B, D, F).

Furthermore, localized inflammation exhibited by redness with injected vessels in the latter sites can also be observed (Figure 3E). Because of the close anatomic association between inflammation and ocular surface staining in the area of conjunctivochalasis it was speculated that the redundant conjunctiva may be linked to an inflammatory process.

Furthermore, the most susceptible area is noted in the inferior limbus and the inferior bulbar conjunctiva, and this site corresponds to dye staining in the nonexposure zone (Figure 3C, D).

This finding is worth noting because the characteristic pattern of staining in the nonexposure zone is different from the exposure-zone pattern that occurs in patients with dry eye (unstable tear film)[12].

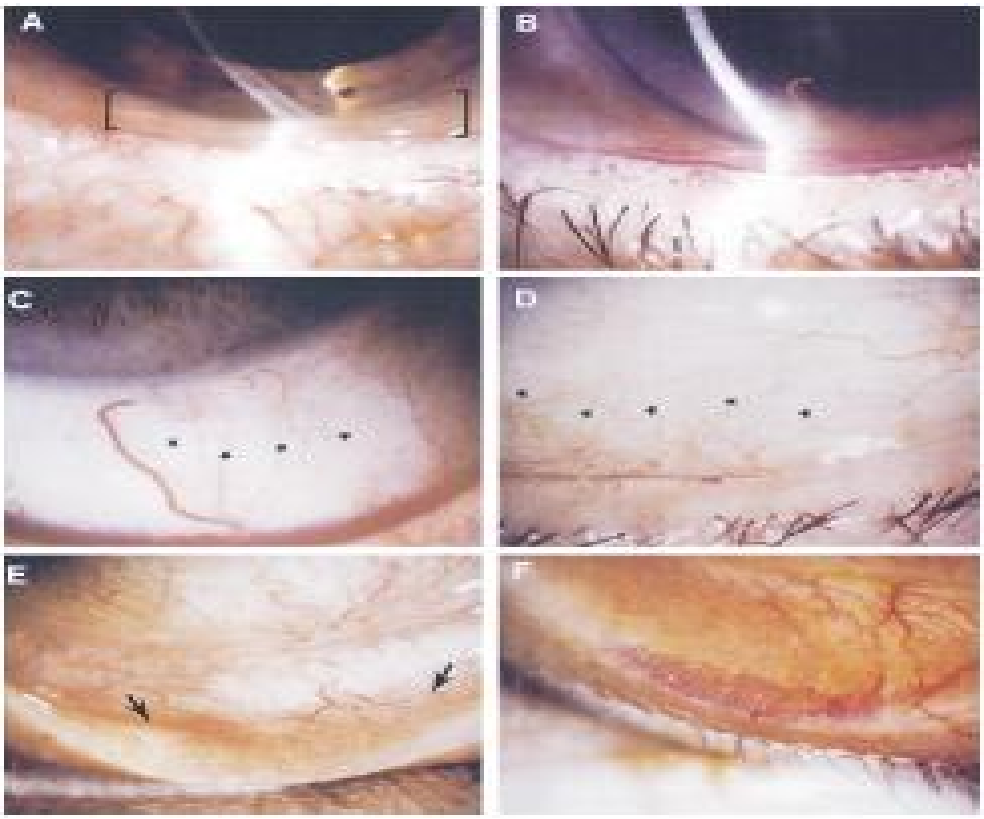

Figure (3): (A) A representative case of conjunctivochalasis showing redundant conjunctiva (indicated by brackets), which covers the inferior limbus and inferior part of the cornea and disturbs the formation of an adequate tear meniscus. **(B)** Rose Bengal staining of the same eye showing positive punctuate staining in conjunctivochalasis and the lid margin. **(C)** After the lower lid was pulled down to reveal the nonexposure zone, positively stained redundant conjunctiva spread down to the inferior bulbar conjunctiva (outlined by asterisks). This picture can also be elicited by upgaze. **(D)** Another representative case of conjunctivochalasis showing punctuate staining by rose Bengal of the conjunctival folds, which fell down to the fornix area (outlined by asterisks) after the lower lid was pulled down. **(E)** The tarsal conjunctiva adjacent to the conjunctivochalasis in injected with hyperemia extending to the lid (indicated by arrows). **(F)** The same area reveals strong positive staining by rose Bengal[(1)].