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## Mustard Gas

In this issue of IRJO Panahi and coworkers have presented an extensive and interesting review on ocular manifestations of mustard gas (MG) which includes the clinical, immunochemical, pathology, etc. of MG. MG which has been used as an aggressive, vesicant, and destructive warfare agents in the last century still being used in our time. Therefore, it is mandatory for all of us to be aware of its manifestations and complications and to be acquainted with its pathology and treatments.

MG is a lipophilic, highly reactive alkalizing and cytotoxic agent which has been used during the Iran-Iraq war (1980-1988), and it has been well studied by several medical and scientific teams in this country.

It has an acute, a chronic and a late-onset presentation. The acute lesions appear within 24 hours and the symptoms include irritation of the eye, corneal erosion, subconjunctival hemorrhage etc. They are observed in more than 90% of the exposed individuals but in most cases they regress and disappear in few weeks.<sup>1</sup> The severe forms include the chronic cases where the initial lesions have not disappeared but exacerbated or the late-onset cases which can appear years after exposure.<sup>2</sup> These severe forms consist of less than 1% of exposed patients but they are very aggressive and sight-threatening and need special attention, follow-up and care.<sup>3</sup>

These severe cases which are also called mustard gas keratopathy (MGK) are presented by the following symptoms: chronic, keratitis, limbal and conjunctival pathologic changes. Javadi and coworkers in their presentation of 48 MG patients with chronic and delayed-onset stated that "ocular surface changes included chronic blepharitis and decreased tear meniscus in all patients, limbal ischemia (81.3%), conjunctival vascular abnormalities (50%). Corneal signs in order of frequency were: scar or opacity (87.5%), neovascularization (70.8%), thinning (58.3%), lipid deposits (52.1%), amyloid deposits (43.8%), epithelial defects and irregularity (31.3%)". They also stated that 31 patients (64.6%) had chronic symptoms, whereas 17 (35.4%) had delayed-onset manifestations.<sup>2</sup>

Khateri and coworkers reported the health status of 34,000 injured veterans of Iraqi-Iranian war who were exposed to MG after more than a decade of exposure.<sup>3</sup> 39.3% of their patients had ocular problems but less than 1% had severe ocular manifestations. The management of these severe cases has been indicated by Razavi and his coworkers<sup>4</sup> with the emphasis on the importance of a very meticulous and constant follow-up of these patients. In their report and follow-up of 36 to 198 months of their cases 79.4% out of 175 eyes needed one or several interventions during the follow-up. Their treatment included punctal plaque or occlusion, tarsorrhaphy, manual lamellar or perforating keratoplasty, stem cell transplantation or combination of techniques. They particularly insist on lamellar keratoplasty since the deep cornea remains untouched in most areas.

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### References

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