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ENDEMIC GLAUCOMA IN THE MUNE-BRGUD AREA

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SUMMARY – In the past century, research into the prevalence of congenital glaucoma among the Mune and Brgud villagers showed that glaucoma was present in 38% of the population. Genealogical studies established the presence of congenital glaucoma through six generations of the villagers. Tradition has it that members of the Šori family have diseased eyes from time immemorial and that other families have through generations been linked to this family, in a repeated circle of conjugal relationships. From the considerable documentation collected, it appears that approximately 50% of the population are genetically linked to the central Šori family. In this group, about half of the offspring show symptoms of this congenital disease. Clinical characteristics of the Mune-Brgud congenital glaucoma are similar to those of the late congenital glaucoma. It is caused by a congenital anomaly of the iridocorneal angle, and is clinically manifested between the age of 10 and 40. It is characterized by goniodysgenesis and high insertion of the iris, remnants of undifferentiated mesodermal embryonic tissue, widening of the trabecular meshwork, decreased aqueous outflow, and regularly present markedly deep anterior chamber. Megalocornea, hypoplasia of the corneal stroma and moderate myopia are present sporadically.

Key words: *Mune-Brgud glaucoma, hereditary glaucoma, congenital glaucoma*

The villages of Mune and Brgud are situated in the north Adriatic region, on the slopes of the Učka Mountain (Fig. 1). In the past century, the research into the prevalence of congenital glaucoma among villagers of the Mune and Brgud villages showed that glaucoma was present in 38% of the population. Genealogical studies established the presence of congenital glaucoma through six generations of the Mune and Brgud villagers.

Generally, the anomaly that results in congenital glaucoma is genetically determined and shows the recessive inheritance pattern in most cases. This means that both parents are heterozygous and have a single defective gene. Twenty-five percent of their offspring would be expected to have two defective genes and thus to exhibit infantile glaucoma.

In the past generations, all Mune-Brgud family members had glaucoma, and considering its clinical manifestation, the disease had a "dominant character". Since it is a specifically structured clinical manifestation in a geographically restricted population, the genetic material accumulated (modifier) in the heterozygote to the homozygote with a very high expression of the mutant gene where, through the evolution of dominance, a new form of glaucoma developed, known as the Mune-Brgud type of glaucoma[1].

Genealogical studies report on typical family names of families with glaucoma that recur in conjugal relationships through several generations. These family names are Afrić, Ujčić, Hrvatin, Štenberger, Stambul, Brentin, Gregorić and others, and experience confirms that a glaucomatous disease can be seriously suspected in relation to the family name.

It has been reported that the Mune and Brgud villagers have a traditional 200-year-old lifestyle and are strictly confined to their villages. The elders have by common consent rejected the possibility of the railroad passing through their village because it might disturb the livestock, and to prevent strangers from coming to their village (Fig. 2).

The villagers lived a simple, modest and neighbor-dependent life. They were mainly farmers and foresters, while the eminent family nicknamed Šori that had

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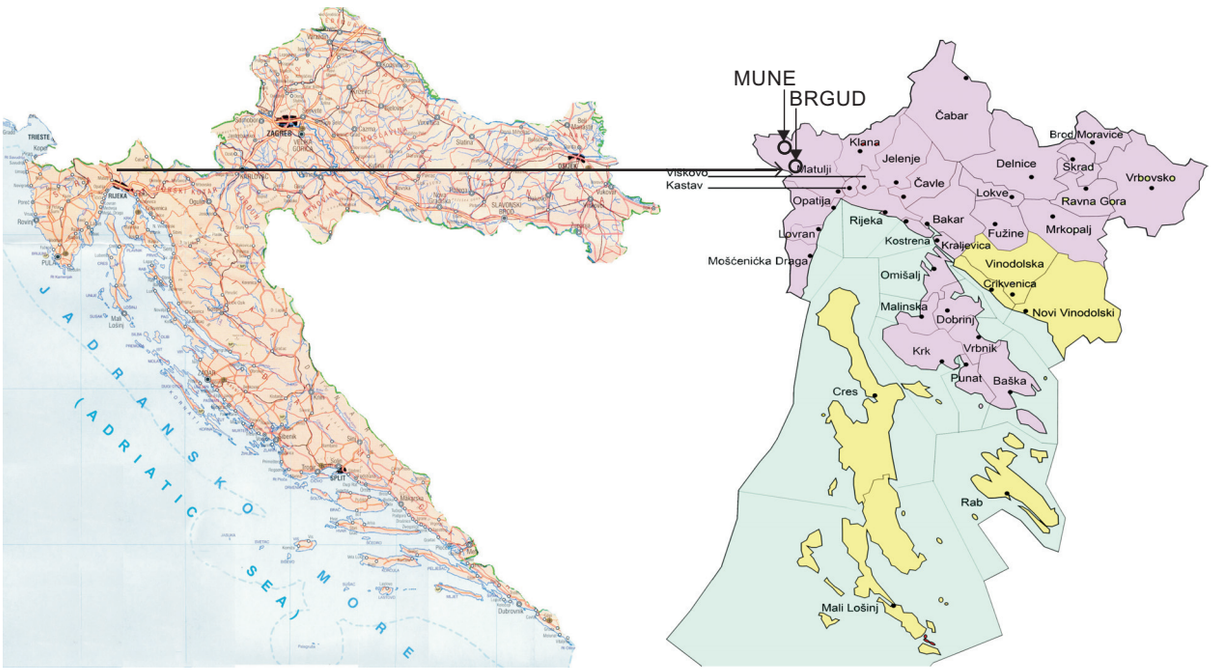

Fig. 1. The villages of Mune and Brgud on the slopes of the Učka Mountain.

27 members 200 years ago, carried on trade. Even today people talk about them. Their nickname could have come from *signori*, *Šiori* in the dialect, meaning Italian gentlefolk, which meant that they were the most significant and the most distinguished family in the village, smarter and richer than others. They were the first in the village and they made important decisions regarding the community as the village elders.

Close relatives married each other. To this day, the elderly of the region say that it is better that the grandson marries a girl from the family in order that everyone remains in the house, the family stays united and the property preserved.

Tradition has it that members of the Šori family have diseased eyes from time immemorial and that through generations other families have been linked to this fam-

Fig. 2. A typical Mune-Brgud rustic house.

Fig. 3. Two of them are blind Mune-Brgud villagers who never leave their villages.

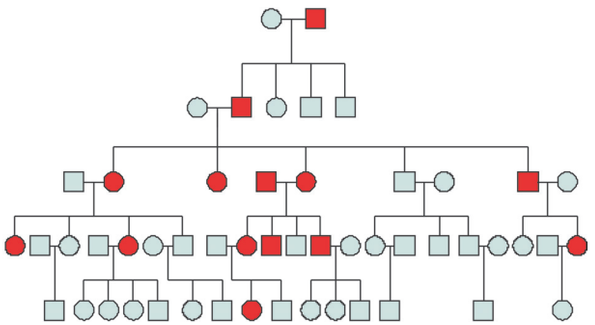

Fig. 4. Genealogical tree of the Afrić, Stambul and Gregorić families.

ily in a repeated circle of conjugal relationships, which is evident from the existing nicknames. Even today, nicknames like Žvanetovi, Kušiljeri, Jurendovi, Starčovi, Vrklinari, Barežinovi and Miminovi are interlinked and originate directly from the Šori family. Close families welcomed marriages into the Šori family, which dominated economically and had therefore attractive marital partners for poor families.

From the considerable documentation collected, it appears that approximately 50% of the population are genetically linked to the central Šori family. In this group, about half of the offspring show symptoms of this congenital disease. In some families, the prevalence of the disease is even higher (Fig. 3).

It is remarkable that other nicknames not connected to the Šori family show no hereditary taint of the disease. The first link of congenital glaucoma, which directly appears in the above mentioned families of relatives linked by consanguineous marriages, is thus accounted for[2].

On the genealogical tree of the Afrić, Stambul and Gregorić families, glaucoma is manifested in 80% of the

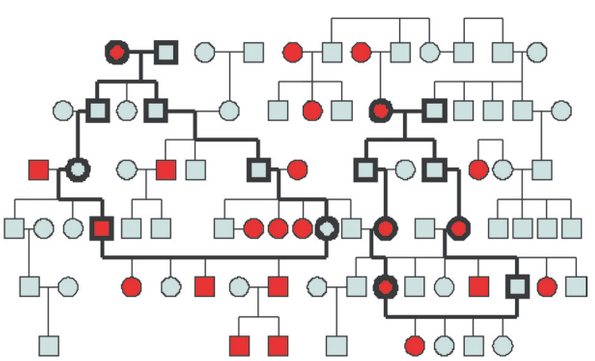

Fig. 5. Genealogical tree of the Afrić and Brentini families.

2nd generation family members and in 75% of the 3rd generation family members. In the 4th generation of subjects, the disease has not appeared so far (Fig. 4).

On the genealogical tree of the Afrić and Brentini families, consanguinity is not observed in the 3rd generation (Fig. 5).

These deeply rooted characteristics, established through a particular lifestyle and linked by consanguinity of the villagers, disappeared for the most part after World War I and World War II, and as the result of migration, mostly to the USA, which has only reflected in the last two generations. Mixed marriages are no longer taking place as the result of modern way of life and better communications. This is the main reason why the manifestation of congenital glaucoma in these villages has been decreasing, however, the inheritance component of the disease is still observed depending on the expression of the disease in the new marital relationships.

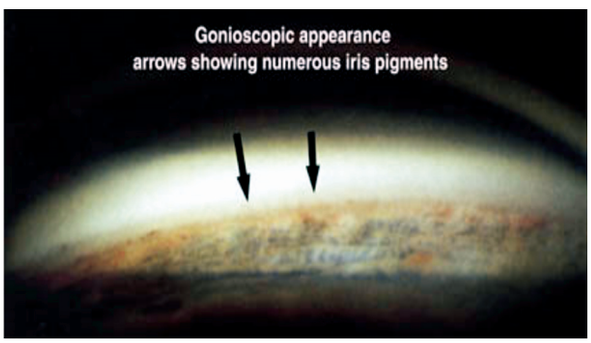

Fig. 6. Widening of the trabecular meshwork and markedly deep anterior chamber.

Clinical characteristics of the Mune-Brgud congenital glaucoma are similar to those in the late congenital glaucoma (*glaucoma congenitum tardum*)[3]. It is caused by a congenital anomaly of the iridocorneal angle, and is clinically manifested between the age of 10 and 40. It is characterized by goniodysgenesis and high insertion of the iris, remnants of undifferentiated mesodermal embryonic tissue, widening of the trabecular meshwork, decreased aqueous outflow, and a regularly present markedly deep anterior chamber. Megalocornea, hypoplasia of the corneal stroma, and moderate myopia are present sporadically[4] (Fig. 6).

Treatment is administered according to the principles of treatment for congenital glaucoma. The method of choice is antiglaucomatous filtering surgery[5]. In clinical practice, we have observed that even when the dis-

ease is medicamentously stabilized, sudden relapse may occur with elevated intraocular pressure, quick development of glaucomatous cupping, and rapid visual field deterioration leading to blindness, all in one year. For this reason, almost all of our registered patients with glaucoma of the Mune-Brgud type underwent surgery. Newly detected cases of glaucomatous disease that either by inheritance or by characteristic family names or by typical clinical manifestations pertain to the families from Mune and Brgud are under intensive follow up 4 to 5 times a year.

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Sažetak

ENDEMSKI GLAUKOM U NASELJIMA MUNE I BRGUD

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U prošlom stoljeću su istraživanja učestalosti kongenitalnog glaukoma kod stanovnika naselja Mune i Brguda pokazala kako je glaukom bio prisutan u 38% ove populacije. Genealoškim ispitivanjem utvrđeno je da se prisutnost kongenitalnog glaukoma prati kroz šest naraštaja stanovnika. Predaja govori kako su članovi obitelji Šori od davnina imali bolesne oči te da su druge obitelji kroz naraštaje bile vezane uz obitelj Šori kroz opetovani krug bračnih veza. Iz obilne sakupljene dokumentacije proizlazi da je oko 50% populacije ovih sela genetski vezano za središnju obitelj Šori. U toj skupini prosječno polovica potomstva pokazuje simptome ove nasljedne bolesti. Kliničke značajke kongenitalnog glaukoma Mune-Brgud slične su onima kod kasnog kongenitalnog glaukoma. Glaukom Mune-Brgud uzrokovan je kongenitalnom anomalijom u iridokornealnom kutu i klinički se očituje u dobi od 10. do 40. godine života. Obilježava ga goniodisgeneza i visoka insercija šarenice, ostatak nediferenciranog embrijskog mezodermalnog tkiva, prošireni trabekulum, smanjeno istjecanje sobne vodice i redovito prisutna izrazito duboka prednja sobica. Megalokornea, hipoplazija rožnične strome i umjerena miopija su rijetko prisutne.

Ključne riječi: glaukom Mune-Brgud, nasljedni glaukom, kongenitalni glaukom