G3-1563b

Prophylactic Valacyclovir to Prevent Outbreaks of Primary Herpes Gladiatorum at a 28-day wrestling camp-a 10 year review

Boynton Health Service
University of Minnesota
Driven to Discover℠

B.J. Anderson, M.D., Deanna Clasen, ATC, Monique Foster, M.Ed, ATC, Megan Reed, ATC, D.C.
Boynton Health Service, University of Minnesota, Minneapolis, Minnesota, U.S.A

B.J. Anderson, M.D
Boynton Health Service
University of Minnesota
410 Church St. SE
Minneapolis, MN 55455
Phone: (612) 626-0421
E-mail: info@thematdoc.com

BACKGROUND

Since 1989, several outbreaks of Herpes Gladiatorum (HG), due to Herpes Simplex Type-1 (HSV-1), have occurred at this 28-day wrestling camp in Minneapolis, MN. Up to 330 wrestlers, aged 13-18, attend it each summer and from 1989 through 2002 outbreaks have occurred with 50-60 athletes contracting HG and eventually developing a primary outbreak (PHG). With over 70% of these outbreaks occurring on the head, face and neck[3] the potential for serious ocular involvement raises the concern from those in the medical community. This camp has these athletes running 5-10 miles (8-16 km) and wrestling three 2-hour sessions every day in temperatures up to 98˚ F (36.7˚ C) with a relative humidity of 75%. The intensity and duration enhance the stress fostering outbreaks of herpes to develop in infected individuals. Based on the original study in 2003, 3.3% of these individuals enter camp with recurrent HG, yet 29.7% are seropositive for HSV-1.

Several papers have been written in the past outlining the ability of acyclovir to prevent acquisition of HSV. It was Kuzushima's paper[1] utilizing it in a day-care setting that prompted its usage at this 28-day camp. Due to the PK/PD values and dosing parameters, valacyclovir, a prodrug of acyclovir, was recommended. A study performed in 2003 with prophylactic valacyclovir[4] showed promise in its prevention of acquiring PHG. Since 2003 the camp has required all athletes who enter camp to be on oral antivirals.

METHODS

From 2003-2012, up to 332 wrestlers attend this 28-day camp each summer. Camp director requires all participants to enter camp on valacyclovir 1GM QD for the duration of the camp. Individuals are divided into 5 groups according to weight and only wrestle within their group. Daily skin checks are performed by Certified Athletic Trainers (ATC) and those with an outbreak are withheld from practice according to National Federation of State High School Associations (NFHS) rules. All suspicious lesions were evaluated/cultured by a physician

Recognize. Treat. Prevent.

RESULTS

Effects of antiviral usage at 28-day camp 2003-12

# camp participants (Age 12-19 yrs)	2,897
Male	2,891 (99.8%)
Female	6 (0.2%)
Participants with history of HG/RHL[$]	82
Estimates with (+) HSV-1 IgG antibodies[¥]	863
# on antiviral medication	2,060 (71.1%)
Valacyclovir 1GM qd	2,013 (97.7%)
Acyclovir 400mg BID	45 (2.2%)
Famciclovir 500mg qd	2 (0.1%)
Outbreaks	36
On antivirals	10
Not on antivirals	26
Probability of outbreaks	
On antivirals	0.49%
Not on antivirals	3.11%

Probability of HG outbreak (8 years data)

(+) History of HG		
(-) Valacyclovir usage	0.4921	N=12;9 had outbreaks=75.00%
(+) Valacyclovir usage	0.0607	N=51;0 outbreaks=0.00%
(-) History of HG		
(-) Valacyclovir usage	0.0286	N=633;15 had outbreaks=2.37%
(+) Valacyclovir usage	0.0020	N=1,483;6 had outbreaks=0.40%

Compliance

Missed dosages	1	2	>2	Total Noncompliance	# Outbreaks
1st week	16.5%	4.9%	4.1%	25.5%	1
2nd week	17.4%	11.7%	15.1%	44.2%	15
3rd week	13.5%	11.2%	6.9%	31.6%	14
4th week	16.6%	6.6%	5.4%	28.6%	6
Correlation of missed dosages with number of outbreaks	r=-0.288 (2-tailed p=0.712)	r=0.995 (2-tailed p=0.005) (1-tailed p=0.003)	r=0.910 (2-tailed p=0.090) (1-tailed p=0.045)		

[$]HG/RHL= Herpes Gladiatorum/Recurrent Herpes Labialis
[¥]2003 camp study had 29.8% of participants (+) IgG antibodies for HSV-1

Over this10 year period, 2,897 individuals attended camp. 2,060 (71.1%) entered camp on medication. 2,013 (97.7%) on valacyclovir 1GM QD, 45 (2.2%) acyclovir 400mg BID and 2 (0.1%) on famcicylovir 500mg QD. Base on observed outbreaks, probability of occurring while on antiviral medication was 0.49% compared to 3.11% without medication. Comparison of outbreaks within individual groups showed that antiviral medication reduced primary and recurrent outbreaks by 84.2%. When outbreaks occurred they were primarily during weeks with higher noncompliance.

DISCUSSION

Over 1.25 million athletes in the USA compete in wrestling each year. With skin infections affecting 15.7% of high school wrestlers, means to reducing their transmission is important for the health of these athletes. With the majority competing during their adolescent years, contracting a life-long infectious agent such as HSV-1 has potentially serious consequences, i.e herpes kerato-conjunctivitis, retinal necrosis, encephalitis, transmission to sexual partners. Minimizing their risk in a closed community, i.e. wrestling camps, where exposure is at a high level can reduce the risk of contracting this virus. As with Kuzushima's findings, the use of antiviral medication in this closed-community significantly reduced the transmission of this virus. Concerns raised in their study was potential over usage of these agents and driving resistance, but research indicates that risk was small. Over 20 years of usage with acyclovir has shown only a 0.3% resistance in immunocompetent individuals.[2]

Compliance appears to be a significant factor determining if an exposed individual would develop an outbreak. With acyclovir dosing of 2-3 times a day, the athlete's training schedule made compliance more difficult. Valacyclovir once-daily dosing was more conducive to compliance.

CONCLUSION

Prophylactic valacyclovir significantly reduces outbreaks of Herpes Gladiatorum in infected individuals. With greater compliance, usage of valacyclovir may prevent acquisition of Primary Herpes Gladiatorum at this 28-day wrestling camp.

REFERENCES

1. *Kuzushima K, Kudo T, Kimura H, et al. Prophylactic oral acyclovir in outbreaks of primary herpes simplex virus type 1 infection in a closd community. 1992. Pediatrics, 89,379-383.*
2. *Bacon T, Levin M, Leary J, Sarisky R, Sutton D. Herpes Simplex Virus Resistance to Acyclovir and Penciclovir after Two Decades of Antiviral Therapy. 2003. Clin Microb Rev.16,1:114-128.*
3. *Anderson BJ. The epidemiology and clinical analysis of several outbreaks of herpes gladiatorum. 2003. Med. Sci. Sports Med. 35(11):1809-1814.*
4. *Anderson BJ. Prophylactic Valacyclovir to Prevent Outbreaks of Primary Herpes Gladiatorum at a 28-Day Wrestling Camp. 2006. Jpn. J. Infect. Dis. 59:6-9.*

Effects of Antiviral Medication usage at 28-day wrestling camp from 2003-12

# camp participants (Age 12-19 years) **Male** **Female**	**2,897** **2,891 (99.8%)** **6 (0.2%)**
Participants with history of HG/RHL[1] Estimates with (+) HSV-1 IgG antibody[2]	82 863
# camp participants on oral antiviral medications Valacyclovir 1 GM qd Acyclovir 400mg BID Famciclovir 500mg qd	2,060 (71.1%) 2,013 (97.7%) 45 (2.2%) 2 (0.1%)
Outbreaks On antivirals Not on antivirals	36 10 26
Probability of outbreaks On antivirals Not on antivirals	 0.49% 3.11%

[1]HG/RHL = Herpes Gladiatorum/Recurrent Herpes Labialis
[2]2003 camp study showed 29.8% of wrestlers with (+) HSV-1 IgG antibodies

Probability of Herpes Gladiatorum (HG) Outbreaks (8 years data)

(+) History of HG		
(-) Valacyclovir	0.4921	N=12; 9 had outbreaks=75.00%
(+) Valacyclovir	0.0607	N=51; no outbreaks=0.00%
(-) History of HG		
(-) Valacyclovir	0.0286	N=633; 15 outbreaks=2.37%
(+) Valacyclovir	0.0020	N=1,483; 6 outbreaks =0.40%

Compliance with daily dosing of oral antiviral medication at 28-day wrestling camp 2003-12

Missed dosages	**1**	**2**	**>2**	**Total Noncompliance**	**# Outbreaks**
1st week	16.5%	4.9%	4.1%	**25.5%**	1
2nd week	17.4%	11.7%	15.1%	**44.2%**	15
3ed week	13.5%	11.2%	6.9%	**31.6%**	14
4th week	16.6%	6.6%	5.4%	**28.6%**	6
Correlation of missed dosages with number of outbreaks	r=-0.288 (2-tailed p=0.712)	r=0.995 (2-tailed p=0.005) (1-tailed p=0.003)	r=0.910 (2-tailed p=0.090) (1-tailed p=0.045)		