Dexamethasone as Prophylaxis for Acute Mountain Sickness

Effect of Dose Level


Rapid exposure of unacclimatized persons to high altitude causes the syndrome acute mountain sickness (AMS). Prophylactic treatment with frequent high doses of dexamethasone has been shown to prevent AMS. To determine whether lower, less frequent doses were effective in preventing AMS, 28 men between the ages of 18 and 32 were exposed to a simulated altitude of 4,570 m for 45 h in a hypobaric chamber on two occasions while taking one of three doses of dexamethasone (4 mg, 1 mg, or .25 mg every 12 h) or a placebo in a double-blind, crossover design. The 4-mg dose of dexamethasone reduced the incidence of AMS symptoms compared with placebo and the other dose levels.

Acute mountain sickness (AMS) is a syndrome induced by hypoxia in unacclimatized individuals who ascend rapidly to high altitude and remain there for more than several hours. Characteristic symptoms include headache, nausea, vomiting, anorexia, lassitude, and sleep disturbances. The onset occurs 3 to 12 h after an ascent, and symptoms usually remit gradually over three to seven days as acclimatization occurs. The severity of symptoms is directly related to altitude (ie, the degree of hypoxia), the rate of ascent, and probably also to individual differences in ability to acclimate to hypoxia. While the pathophysiology of AMS has never been clearly demonstrated, most researchers feel the symptoms are due to hypoxia-induced subclinical cerebral edema.1-3

As mountain recreation has increased in popularity over the past several decades and improvements in transportation have made the high mountains increasingly accessible, more and more people have suffered AMS. This increased frequency of AMS has generated interest in prophylactic measures. Staging, or gradual ascent with frequent one- to two-day halts to allow acclimatization, may be the most successful means of preventing AMS;4,5 but this strategy is not always practical for those with a limited amount of recreation time. Prophylaxis with pharmacologic agents offers an alternative to staging, but until recently, the only drug accepted for this purpose was acetazolamide, which is only partially effective in controlling symptoms6 and has undesirable side effects.

In a double-blind, crossover trial reported in 1984, Johnson et al7 demonstrated that prophylaxis with 4 mg of dexamethasone every 6 h was highly effective in preventing AMS symptoms in healthy young men rapidly exposed to 4,570 m altitude in a hypobaric chamber. A subsequent study using the same dose regimen at 4,300 m on the summit of Pikes Peak, Colo, showed similar results,8 although subjects taking dexamethasone experienced symptoms of AMS when the drug was discontinued.

While the studies cited above suggest that dexamethasone is potentially useful in preventing AMS, the 4 mg every 6 h dose regimen, which has been used in all investigations to date, is not particularly convenient in the high mountain environment, and the total daily dose (16 mg/day) is relatively high. Neither of these factors constitutes a contraindication to the use of dexamethasone in this role, but a lower total dose and less frequent administration schedule would have distinct advantages. Two recently reported studies compared a smaller, but still substantial, total

AMS = acute mountain sickness; ESQ = Environmental Symptoms Questionnaire

Altitude Research Division, US Army Research Institute of Environmental Medicine, Natick, Mass.;* Respiratory Division, Brigham and Women's Hospital, Thorndike Laboratories and Charles A. Dana Research Institute, Department of Medicine, Beth Israel Hospital and Harvard Medical School, Boston.† Human subjects participated in this study after giving their voluntary informed consent. Approval of the study by the USAIRIEM Human Use Review Committee and the US Army Surgeon General's Human Use Review Committee were obtained prior to its initiation. Investigators adhered to AR 70-25 and USAMRDC Regulation 70-25 on the use of volunteers in research. The views, opinions, and findings contained in this report are those of the authors and should not be construed as an official Department of the Army position, policy, or decision unless so designated by other official documentation. Manuscript received February 15; revision accepted July 26. Reprint requests: Dr. Rock, USAIREM, Natick, MA 01760-5007

Dexamethasone as Prophylaxis for Acute Mountain Sickness (Rock et al)
dose of dexamethasone (4 mg every 8 h) to an
acetazolamide regimen and found that smaller dose of
dexamethasone to be effective in preventing AMS.9,10

In an attempt to discern the simplest and lowest
effective dose regimen, we examined three every 12 h
regimens of less than 12 mg dexamethasone/day in
young men acutely exposed to 4,570 m simulated
altitude in a hypobaric chamber. The results suggest
that a regimen using a dose of 4 mg of dexamethasone
twice a day is effective in reducing AMS symptoms,
but lower doses are not.

MATERIAL AND METHODS

Twenty-eight young, healthy men served as test subjects after
giving their informed consent. All were lifelong residents at low
altitude, and none had experienced any prolonged exposure to
altitudes greater than 2,500 m in the six months immediately
preceding the study. Each subject underwent a review of his medical
history, a physical examination, and laboratory screening prior to
inclusion in the study. Potential subjects with any contraindication
to taking dexamethasone or to undergoing altitude exposure were
excluded from participation in the study.

A double-blind, placebo-controlled, crossover design was used in
which each subject served as his own control. Prior to the beginning
of testing, 30 subjects were assigned at random by an individual not
involved in the data collection to a dose regimen of either 0.25 mg, 1 mg, or 4 mg of dexamethasone orally every 12 h. Two assigned
subjects were unable to participate for personal reasons and
withdrew from the study prior to the beginning of testing. The
remaining subjects were exposed to a simulated altitude of 4,570 m
(428 mm Hg) for 45 h in a hypobaric chamber on two occasions
separated by three weeks. During one exposure they were given
their assigned dose regimen of dexamethasone and during the other
an identically appearing placebo containing lactose. The order of
treatment was randomly assigned to each subject but was counter-
balanced for the total number of subjects in each dose level to
minimize any order effects. Neither the subjects nor the investigators
collecting the data were aware of which treatment the subjects were
receiving during drug administration and data collection.

Three of the 28 subjects who participated in the first altitude
exposure did not participate in the crossover phase of the study.
Two were excluded due to viral illness, and one was withdrawn for
administrative reasons unconnected with the study conditions. The
data from these three individuals were not included in the analysis.

Subjects were exposed to altitude in groups of four or five
individuals which contained representatives from each dose regi-
men. They entered the altitude chamber at 3 pm on the day before
ascent to participate in sea level testing. At 7 am the next morning
they received their first dose of medication. At 7 pm that same
day they received a second dose, and the chamber was evacuated to the
simulated altitude of 4,570 m (428 mm Hg) at a rate of 600 m/min.
The subjects remained at that altitude for 45 h. While in the
chamber, they were given unrestricted access to a nutritionally
balanced diet and were free to pursue sedentary leisure activities
when not involved in testing. They continued to take dexamethasone
or placebo at 7 am and 7 pm throughout the altitude exposure.

Subjective symptoms of AMS were assessed twice daily at sea
level, and at altitude using the Environmental Symptoms Question-
naire (ESQ) and a physician’s clinical interview. The ESQ is a 67-
question inventory of symptoms that occur in stressful environments
including heat, cold, and high terrestrial altitude.11 It was adminis-
tered to the subjects individually using an interactive computer
software package. The program queried each subject about specific
symptoms, and he then chose one of six phrases ranging from “not
at all” to “extreme” to quantify the presence and severity of that
symptom within himself at that moment. The responses were
assigned values from 0 (not at all) to 5 (extreme), and a weighted
average of cerebral symptoms termed “AMS-C” and respiratory
symptoms termed “AMS-R” were derived from the scores. These
measures have been shown in previous studies to accurately and
reliably identify individuals suffering AMS.11

The clinical interview was performed by a physician (R.F.L.)
who was unaware of the subject’s responses on the ESQ at the time
of the interview. He examined the subjects for rales and peripheral
edema and recorded the presence of specific altitude-related
symptoms such as headache, nausea, dyspnea, and sleep distur-
bances. Following the completion of the study, symptom scores
were calculated for each subject on the basis of a scale reported by
Johnson et al12 as follows: 0, no symptoms; 1, mild headache or
nausea; 2, moderate headache and nausea; and 3, severe headache,
nausea, and vomiting, or some combination of these. A score of 1 or
greater was considered to be indicative of AMS.

To obtain an additional perspective of each subject’s overall state
of well-being during the intervals between symptom assessments,
the subjects were asked to rate each other. Twice daily at sea level
and altitude, each test subject was given a list of the names of the
other subjects in the group and was asked to rate those subjects as
“well,” “sick,” or “very sick.” Each was instructed to make his
assessment on the basis of what he had observed of his companions
during the preceding 12 h and was not allowed to query them about
their condition. The ratings were scored as 0, well; 1, sick; and 2,
very sick. A mean score for each subject was calculated for each
rating period.

Because the pathophysiology of AMS may involve changes in
body fluid balance and a previous study suggested a correlation
between AMS scores and changes in urine output,13 several measures
indicative of fluid status were obtained. All fluid and food intake
and the volume of urine output were recorded. Blood samples were
taken without stasis from a peripheral arm vein every morning
before the subjects arose for determination of Hb and Hct, and
plasma volume changes were calculated from these values using the
method of Strauss et al.14 Nude body weights were measured daily
after the first morning urine voiding.

The effect of dexamethasone on the adrenal cortex was assessed
by measuring plasma cortisol levels twice daily while the subjects
were taking dexamethasone or placebo. The first blood sample for
cortisol determination was taken at 8 am, prior to the subjects’
arising. The second daily sample was taken at 4 pm, after the
subjects had been upright in a seated or standing position for at
least 1 h.

An ACTH stimulation test was given to each subject 48 h after
returning to sea level following each exposure to determine if the
drug regimen had caused any degree of adrenal suppression. During
this test, subjects were at rest in a seated position. A catheter was
inserted into a peripheral vein in the forearm and a sample taken
for cortisol analysis. Each subject was then injected with .25 mg of
cosyntropin (Cortrosyn) (Organon Pharmaceuticals) into the deltoid
muscle of the shoulder. Repeated blood samples were taken at 30
min and 60 min for cortisol analysis. Plasma cortisol levels were
determined using commercially available RIA kits (Diagnostic
Products Corp.).

Statistics

Values are represented as mean ± SEM except where noted. The
ESQ, fluid status, and hormonal data were analyzed with a two-way
ANOVA for repeated measures using BMDF software on a VAX 11/
7800 computer (Digital Equipment Corp.). Significant differences
were localized by post hoc testing using Tukey’s method.15 Data
from the clinical interview and peer review were analyzed with a
Wilcoxon signed-rank test using BMDF software on the VAX 11/780
computer to compare paired differences between dexamethasone
and placebo treatments. All tests were two-tailed, and the level of
significance was considered to be p ≤.05.

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RESULTS

The mean age, height, and weight of subjects was 22.3 ± 2.4 yr, 178.1 ± 7.7 cm, and 79.6 ± 12.3 kg, respectively. There were no statistically significant differences between groups.

Dexamethasone had no discernible effect on any of the symptom scores at sea level. There were no statistically significant differences between mean scores on dexamethasone and placebo for any of the doses, and there were no significant differences between doses.

The pattern of ESQ symptom scores while taking placebo during altitude exposure (Table 1) was similar to that which has been previously observed in other chamber studies; i.e., the scores at altitude were significantly higher than sea level scores, and the highest scores were found early in the altitude exposure, followed by progressively lower scores over time.\(^7\)\(^6\)\(^7\) This pattern is consistent with the gradual remission of AMS as the subjects acclimate to hypobaric hypoxia. The pattern was also present to a lesser degree when the subjects were taking dexamethasone. The decrease in scores over time was statistically significant. Additionally, some mean AMS-C scores in the 4-mg placebo group were significantly higher than those of the other two dose-groups on placebo.

Dexamethasone had a significant overall effect of reducing symptom scores compared with placebo. Specifically, the 4-mg dose of dexamethasone reduced symptoms of AMS during altitude exposure, while the lesser doses did not (Table 1). The mean morning scores for AMS-C and AMS-R on 4 mg were significantly lower than placebo.

While the 4-mg dose reduced mean symptom scores on the ESQ, it did not prevent AMS from occurring in some persons, at least not based on previously established criterion scores for identifying "sick" subjects (AMS-C>0.7 and AMS-R>0.6).\(^1\) Five of the eight subjects taking 4 mg dexamethasone were "sick" at some period during the altitude exposure compared with seven of eight while taking placebo. The 4-mg dose was associated with a more rapid resolution of cerebral symptoms than occurred during placebo administration. Only two of the eight subjects taking 4 mg dexamethasone met the criteria for having AMS at the end of the exposure compared with seven of the eight while taking placebo.

The results of the clinical interview confirm the subjective findings from the ESQ. Although 4-mg and 1-mg doses of dexamethasone generally reduced the mean scores compared with placebo on the Johnson scale, only those for the 4-mg dose during the first test period was statistically significant (Table 1). Again, dexamethasone did not prevent AMS based upon the number of individuals judged "sick" based on the previously established criterion of a score ≥1. Six of the eight taking 4 mg dexamethasone were "sick" at some period during the altitude exposure compared to all eight on placebo. Also, again, 4 mg dexamethasone appeared to hasten recovery, for only two of the eight taking that dose were sick at the end of the altitude exposure, compared with seven of the eight on placebo.

The improvement in objective appearance while taking the higher doses of dexamethasone was apparent

Table 1 — Symptom Scores during Sea Level and Altitude Exposure*

<table>
<thead>
<tr>
<th>Dose</th>
<th>AMS-C</th>
<th>AMS-R</th>
<th>Johnson Score</th>
<th>Peer Review</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P</td>
<td>D</td>
<td>P</td>
<td>D</td>
</tr>
<tr>
<td>0.25 mg Sea level (n=8)</td>
<td>0.6±0.3</td>
<td>0.6±0.0</td>
<td>0.6±0.0</td>
<td>0.6±0.0</td>
</tr>
<tr>
<td>ALT 1 AM</td>
<td>1.44±0.4†</td>
<td>1.50±0.56</td>
<td>1.07±0.28</td>
<td>0.82±0.21</td>
</tr>
<tr>
<td>FM</td>
<td>0.88±0.34†</td>
<td>0.93±0.37</td>
<td>0.64±0.26</td>
<td>0.70±0.27</td>
</tr>
<tr>
<td>ALT 2 AM</td>
<td>0.84±0.47†</td>
<td>0.96±0.37</td>
<td>0.71±0.31</td>
<td>0.58±0.20</td>
</tr>
<tr>
<td>FM</td>
<td>0.68±0.45</td>
<td>0.66±0.41</td>
<td>0.44±0.29</td>
<td>0.46±0.20</td>
</tr>
<tr>
<td>1.0 mg Sea level (n=9)</td>
<td>0.10±0.40</td>
<td>0.05±0.01</td>
<td>0.10±0.04</td>
<td>0.09±0.02</td>
</tr>
<tr>
<td>ALT 1 AM</td>
<td>0.20±0.35</td>
<td>0.13±0.41</td>
<td>1.17±0.21</td>
<td>0.88±0.20†</td>
</tr>
<tr>
<td>FM</td>
<td>1.18±0.30</td>
<td>1.14±0.32</td>
<td>0.62±0.20</td>
<td>0.55±0.15</td>
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<tr>
<td>ALT 2 AM</td>
<td>0.73±0.14†</td>
<td>0.80±0.22</td>
<td>0.50±0.13†</td>
<td>0.57±0.11</td>
</tr>
<tr>
<td>FM</td>
<td>0.53±0.17†</td>
<td>0.73±0.21</td>
<td>0.37±0.31</td>
<td>0.35±0.06</td>
</tr>
<tr>
<td>4.0 mg Sea level (n=8)</td>
<td>0.13±0.03</td>
<td>0.16±0.05</td>
<td>0.11±0.03</td>
<td>0.12±0.03</td>
</tr>
<tr>
<td>ALT 1 AM</td>
<td>2.71±0.36†</td>
<td>2.06±0.25†</td>
<td>1.35±0.20</td>
<td>0.56±0.08†</td>
</tr>
<tr>
<td>FM</td>
<td>2.05±0.37†</td>
<td>1.27±0.45</td>
<td>0.94±0.22</td>
<td>0.52±0.15</td>
</tr>
<tr>
<td>ALT 2 AM</td>
<td>2.24±0.49†</td>
<td>0.87±0.39†</td>
<td>1.25±0.38†</td>
<td>0.46±0.19†</td>
</tr>
<tr>
<td>FM</td>
<td>1.45±0.36†</td>
<td>0.81±0.40</td>
<td>0.35±0.14</td>
<td>0.36±0.11</td>
</tr>
</tbody>
</table>

*AMS-C, cerebral symptom score; AMS-R, respiratory symptom score; P, placebo; D, dexamethasone; ALT 1, ALT 2, first and second day of simulated altitude exposure.
†Different from 4.0 mg, p<.05.
‡Different from placebo, p<.05.
§Different from 0.25 mg, p<.05.
¶Different from 1.0 mg, p<.05.
to other test subjects during the periods between symptom assessment. Peer rating mean scores in subjects taking 4 mg dexamethasone were lower than placebo during all periods at altitude and were lower in all but the final period in subjects taking 1 mg (Table 1). The difference was statistically significant at the 4 mg dose during the first, third, and fourth test periods. In contrast to the results on the ESQ and the clinical interview, 4 mg dexamethasone appeared to prevent AMS in more individuals based on a criterion score of ≥1. Using this criterion, only three of eight subjects were judged to have AMS while taking 4 mg dexamethasone during altitude exposure, compared to seven of those eight while taking placebo.

Altitude exposure had a significant effect on the parameters of body fluid balance measured during this study, but treatment with dexamethasone did not. Fluid intake was significantly decreased from 2,436.7 ± 140.0 ml at sea level to 1,587.0 ± 129.4 ml and 1,420.1 ± 114.8 ml on days 1 and 2 of altitude exposure, respectively (p < .05). Urine volume during the same periods fell significantly, from 1,640.9 ± 129.2 ml to 1,284.9 ± 111.0 ml and 945.9 ± 82.4 ml (p < .001). There were no significant changes in percent plasma volume, although Hb and Hct values increased significantly from 14.6 ± 2 mg/dl and 43.6 ± 4 percent at sea level to 15.7 ± 2 mg/dl and 46.7 ± 3 percent on day 2 at altitude (p < .001). The subjects' mean body weight decreased significantly from 80.1 ± 2.1 kg at sea level to 78.3 ± 2.0 kg on day 2 at altitude (p < .001). There were no significant differences between dexamethasone and placebo treatments or between dose levels of dexamethasone for any of these parameters.

Resting plasma cortisol levels showed significant diurnal variation with the highest values occurring in the morning samples (Table 2). This pattern was superimposed on altitude and treatment effects. Both 1 mg and 4 mg of dexamethasone caused a significant decrease in plasma cortisol levels compared to placebo. Altitude exposure caused a significant increase in cortisol levels except during treatment with 1 mg and 4 mg of dexamethasone.

Treatment with dexamethasone did not cause any apparent adrenal suppression at 48 h postexposure. Mean cortisol levels increased from a baseline of 16.6 ± 6 μg/dl to 26.5 ± 6 μg/dl at 60 min following ACTH stimulation. There were no significant differences between placebo and control values and no differences between dose levels.

**DISCUSSION**

The results of this study indicate that 4 mg dexamethasone every 12 h will reduce the symptoms of AMS, whereas doses of 1 mg and 0.25 mg are ineffective. That conclusion is based on the finding of significantly lower symptom scores in subjects taking 4 mg dexamethasone during altitude exposure compared with taking placebo during a similar exposure. The validity of these findings is strengthened by the observation that all three independent assessments of AMS used in this double-blind, crossover study showed the same results. A possible caveat is that the placebo scores for the 4-mg group were higher, and in some instances significantly so, than placebo scores for the other two groups. The explanation for that finding is not apparent. Given that the subjects were assigned to the treatment at random, that the order in which they were exposed to either dexamethasone or placebo was counterbalanced within treatment groups, and that they were exposed to altitude in mixed groups containing subjects from at least two dose levels, we would not have expected significant differences in placebo scores. *Post hoc* testing failed to show a significant order effect as a possible explanation for the observed difference. The difference in placebo scores does not affect the conclusion that prophylactic use of dexamethasone reduces AMS symptoms, since that conclusion is based on crossover data. The differ-

<table>
<thead>
<tr>
<th>Dose</th>
<th>AM Values</th>
<th>PM Values</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SL Day 1</td>
<td>Day 2</td>
</tr>
<tr>
<td></td>
<td>SL Day 1</td>
<td>Day 2</td>
</tr>
<tr>
<td>0.25 mg (n = 8)</td>
<td>15.8 ± 1.5</td>
<td>20.8 ± 3.1</td>
</tr>
<tr>
<td>Placebo</td>
<td>13.4 ± 1.3</td>
<td>20.6 ± 3.3*</td>
</tr>
<tr>
<td>Dexamethasone</td>
<td>18.0 ± 1.9</td>
<td>25.4 ± 2.6</td>
</tr>
<tr>
<td>1.0 mg (n = 9)</td>
<td>18.0 ± 1.9</td>
<td>25.4 ± 2.6</td>
</tr>
<tr>
<td>Placebo</td>
<td>13.5 ± 1.3</td>
<td>28.8 ± 2.4</td>
</tr>
<tr>
<td>Dexamethasone</td>
<td>13.5 ± 1.3</td>
<td>5.8 ± 3.3†‡‡§</td>
</tr>
</tbody>
</table>

*Different from 4.0 mg, p < .05.
†Different from placebo, p < .05.
‡Different from 0.25 mg, p < .05.
§Different from 1.0 mg, p < .05.
ences between dose levels are more problematic. However, that the number of sick subjects based on preestablished criterion values for each symptom score was less in the 4 mg compared with the other treatment groups further strengthens the conclusion that 4 mg was more effective than 1 mg or 0.25 mg.

The finding that dexamethasone is an effective prophylactic for AMS confirms the results of previous studies\(^7\)\(^-\)\(^10\) and, importantly, extends those observations to dose levels under 12 mg/day. No study examining the effect of doses lower than 12 mg/day has yet been reported in the literature.

Although the 4 mg every 12 h dose (8 mg/day) was effective in reducing symptom scores, it did not appear as effective as the 4 mg every 6 h dose (16 mg/day) regimen used in the only comparable previous hypobaric chamber study. For instance, the mean AMS-C scores in subjects on 8 mg/day dexamethasone in the present study were reduced by 52.3 percent compared to a reduction of 77 percent in subjects taking 16 mg/day under the same conditions in that earlier study.\(^7\) This result is surprising, for both 8 mg and 16 mg dexamethasone per day are clearly pharmacologic doses, and both effectively suppressed cortisol secretion.

There are at least two possible explanations as to why the 8 mg/day was less effective than the 16 mg/day dose under comparable conditions. One is that the prophylactic effect of dexamethasone follows a dose response curve and is progressively less at lower doses. That the symptom scores did not increase progressively with the 2 mg/day (1 mg every 12 h) and 0.50 mg/day (0.25 mg every 12 h) dose regimens counters this explanation, although it could be argued that there is a threshold between 2 mg/day and 8 mg/day, below which dexamethasone has no effect on AMS. Certainly, 2 mg/day and 8 mg/day were both effective in suppressing cortisol secretion, although again it could be argued that the effect on cortisol is independent of the effect on AMS symptoms.

The other possible reason for the decreased effectiveness of the 8 mg/day dose of dexamethasone compared with the previous study is that the timing of administration played a role. The twice-daily administration used in the present study was chosen to reduce the total amount of steroid taken during a 24 h period. Because dexamethasone has a long biologic half-life, it was felt that a twice daily regimen would still be effective. On the other hand, although the serum half-life of dexamethasone is long, it is well recognized clinically that it must be administered frequently (every 4 to 6 h) in the treatment of cerebral edema. Whether this also holds for prevention of cerebral edema formation is unknown.

There is no way to distinguish between these two possible explanations of the apparent decreased effectiveness of 8 mg/day or less of dexamethasone on the basis of the data from the present study. The actual explanation depends on the mechanism of action of dexamethasone in preventing AMS, which has not been determined. Indeed, the pathophysiologic mechanisms underlying AMS have never been convincingly demonstrated, although there is a general consensus that the symptoms are due to a hypoxia-induced subclinical cerebral edema of either vasogenic or cytotoxic origin.\(^1\)\(^3\) Presumably dexamethasone prevents edema formation by preventing disruption of blood-brain barrier tight junctions or increased pinocytotic activity in capillary endothelial cells.\(^18\) It may also reduce blood flow in cerebral microcirculation\(^19\) or CSF formation, both of which could reduce edema formation or decrease pressure on brain tissue by decreasing the fluid volume in the cranial cavity. Although dexamethasone has been shown to alter the overall fluid balance of the body in cerebral edema,\(^20\) there was no evidence for that effect in the present study.

The observation that doses of dexamethasone less than 12 mg/day are not as effective in preventing AMS symptoms as higher doses has some practical implications for the use of this agent in that role. Although high doses of dexamethasone have been shown to be effective in preventing AMS,\(^7\)\(^-\)\(^10\) the present study indicates that lower doses, which would likely have a lower risk of side effects, are not particularly effective in preventing symptoms. These facts and the observation that AMS symptoms seem to develop after dexamethasone has been abruptly discontinued\(^8\) suggest that this drug may be most successfully used in a treatment rather than a prophylactic role. There is some anecdotal evidence that dexamethasone may work very well for early treatment of severe AMS symptoms.\(^21\) That aspect of its use may be a fruitful area of investigation in the future.

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