New Modification of Hot-Water Irrigation in the Treatment of Posterior Epistaxis

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Background: Tamponade treatment for epistaxis is painful and traumatic to the nasal mucosa, and may necessitate hospitalization for several days. Hot-water irrigation (HWI) was introduced as a treatment of epistaxis more than 100 years ago. In a previous study the treatment proved to be effective, less painful, and less traumatic, and required a shorter hospital stay than tamponade treatment. However, HWI has the risk of aspiration during treatment. To minimize this risk, a special catheter has been designed.

Objectives: To evaluate the modified HWI and to compare the results with tamponade treatment, with respect to patient compliance, effectiveness, recurrence of bleeding, pain, complications, and length of hospital stay.

Patients: A total of 122 patients, hospitalized for posterior epistaxis, were randomized to receive either HWI or tamponade treatment.

Results: In the HWI group, 31 (55%) of the patients could be discharged from the hospital after the initial treatment only, compared with 29 (44%) of the patients treated with tamponade. Using a 10-cm visual analog scale, the mean pain score during treatment was 4.7 in the HWI group compared with 7.5 in the tamponade group. The mean hospital stay was 2.9 days for the HWI group vs 4.0 days for the tamponade group. After discharge from the hospital, necrosis or synechia was found on rhinoscopy in 12 patients (40%) in the tamponade group compared with none in the HWI group.

Conclusions: Compared with tamponade treatment, HWI is as effective, requires a significantly shorter hospital stay, is less traumatic to the nose, and is significantly less painful.


Since the last century, hot-water irrigation (HWI) has been used to obtain hemostasis in obstetric predelivery and postdelivery bleeding events. In 1879, Guice and Fayette introduced HWI as a treatment of epistaxis. For many years this treatment was one of the routine treatments of epistaxis, and had been described in textbooks of otolaryngology up to 1958. With the introduction of the frontal mirror by Turck in 1857 and the discovery of the incandescent lamp by Edison in 1879, it became possible to inspect the nasal cavity, and consequently different types of tamponade treatments were introduced and became the treatment of choice in epistaxis.

In a randomized, controlled study, HWI treatment was found to be as effective as traditional tamponade treatment. The patients experienced less pain and the mean stay in the hospital was shorter. The disadvantage of HWI treatment, however, was that one third of the patients could not cooperate with the procedure and were at a risk of aspiration during the irrigation.

To overcome this complication, one of us (S.-E.S.) has developed a catheter to be used for HWI. The catheter is designed with an inflatable balloon at the end, to seal the posterior choana to minimize the risk of aspiration during the procedure (Figure 1 and Figure 2).

The aim of the present study was to evaluate the modified HWI treatment with traditional tamponade treatment with respect to patient compliance, effectiveness, pain experienced during and after the treatment, early and late recurrence of bleeding, hospitalization time, and complication rate.

RESULTS

HWI TREATMENT

Of the 56 patients randomized to HWI, the treatment was successful in 35 patients.
SUBJECTS AND METHODS

The inclusion criterion was posterior epistaxis requiring hospitalization. During the study period of 1 year (December 1994 to November 1995), 56 patients aged 30 to 89 years (mean, 66 years) were randomized to HWI treatment and 66 patients aged 27 to 83 years (mean, 66 years) were randomized to tamponade treatment. After randomization the patients were asked to complete a 10-cm visual analog scale (VAS), indicating the pain experienced (1) during the treatment, (2) the following morning, (3) the following evening, (4) at discharge from the hospital, and (5) at the visit to the clinic 1 week after discharge. The degree of compliance was noted as was the time needed to obtain hemostasis. For the statistical evaluation, the χ² test and Mann-Whitney rank sum test were used. Significance was set at P<.05.

The treatment was performed using a thermometer (0°C-100°C), a thermo-bucket filled with fresh hot water (50°C) from the hot water tap, a 10-mL and a 100-mL syringe, and the catheter. The patient was instructed to sit with the head flexed and the catheter was introduced via the bleeding nasal cavity (Figure 2, A). The balloon was then filled with 10 mL of hot water, and the catheter was pulled back so that the balloon on the end of the catheter sealed the posterior choana of the bleeding nasal cavity (Figure 2, B). The nasal cavity was irrigated forcefully via the catheter with 500 mL of hot water using a 100-mL syringe (Figure 2, C). After the irrigation the catheter was removed and the patient was observed for 15 minutes. The procedure was repeated once if the bleeding continued.

(63%) (Figure 3). The mean time for obtaining hemostasis was 5 minutes (range, 1-35 minutes). Failure of the treatment or recurrence of bleeding within the first hours after hospitalization (early recurrence) occurred in 21 patients (37%). Irrigation could not be performed in 2 patients because of pain associated with introduction of the catheter into the nasal cavity.

Fourteen patients had been irrigated with less than 500 mL of hot water as prescribed; of these, 6 patients (43%) required additional treatment. Of the 42 patients irrigated with 500 mL or more, only 5 patients (12%) required additional treatment.

Thirty-one patients (55%) could be discharged from the hospital after the initial treatment only, 12 patients (21%) had early recurrence of bleeding, 4 patients (7%) had late recurrence of bleeding, and 9 patients (16%) had both early and late recurrence of bleeding.

TAMPONADE TREATMENT

Among the 66 patients randomized to tamponade treatment, the initial treatment was successful in 42 patients (64%) (Figure 4). The mean time to obtain hemostasis was 2 minutes (range, 1-30 minutes).
Failure of the treatment or recurrence of bleeding within the first hours after hospitalization (early recurrence) occurred in 24 patients (36%). Twenty-nine patients (44%) could be discharged from the hospital after the initial treatment only, 16 patients (24%) had early recurrence, 13 patients (20%) had late recurrence, and 8 patients (12%) had both early and late recurrence of bleeding that required additional treatment.

In all cases the type of tamponade used was individually chosen by the physician on call. The most frequently used tamponade type was the Merocel pope Epistaxis packing (Xomed Surgical Products, Jacksonville, Fla) (Table 1).

The most successful of the tamponade types was the Epistat nasal catheter (Xomed Surgical Products). Treatment with this catheter resulted in 71% of the patients being discharged from the hospital with no need for further treatment. The patients treated with gauze mesh all required additional treatment before discharge from the hospital (Table 1). The other tamponades used were the Simpson Epistaxis Plug (Eschmann Healthcare, Sussex, England) and the Foley catheter (Rush, Waiblingen, Germany), used as a posterior tamponade in combination with a gauze mesh as an anterior tamponade.

ADDENTIAL TREATMENT

Of patients with early recurrence of bleeding, 7 (70%) of 10 patients were successfully treated with HWI and could be discharged from the hospital with no need for further treatment, compared with 21 (60%) of 35 patients treated with tamponade (Figures 3 and 4). This difference was not significant (P = .05, x² test).

PAIN DURING AND AFTER TREATMENT

Before inserting the nasal tamponade, the nasal cavity was anesthetized using cotton embedded in phenylephrine hydrochloride and tetracaine packed in the bleeding nasal cavity for 10 to 15 minutes. In patients randomized to HWI treatment, the only anesthetic was lidocaine gel on the tip of the catheter.

As indicated by the patients on a 10-cm VAS, the introduction of the gauze mesh was the most painful treatment, with a mean VAS pain score of 9.0 (Table 2). Of the tamponades, the Merocel was the least painful (score of 6.7). On average, the VAS score for the tamponade treatment was 7.5. Treatment with HWI was significantly (P < .001, Mann-Whitney rank sum test) less painful than all of the various tamponade types used, with a mean VAS score of 4.7.

Table 1. Number of Treatments Correlated to Different Types of Tamponade and HWI Treatment

<table>
<thead>
<tr>
<th>Tamponade Type†</th>
<th>No. (%) of Patients Who Required</th>
<th>Only Initial Treatment</th>
<th>Additional Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epistat</td>
<td>17 (26)</td>
<td>12 (71)</td>
<td>5 (29)</td>
</tr>
<tr>
<td>Foley</td>
<td>10 (15)</td>
<td>2 (20)</td>
<td>8 (80)</td>
</tr>
<tr>
<td>Mesh</td>
<td>9 (14)</td>
<td>0</td>
<td>9 (100)</td>
</tr>
<tr>
<td>Merocel</td>
<td>20 (30)</td>
<td>8 (40)</td>
<td>12 (60)</td>
</tr>
<tr>
<td>Simpson</td>
<td>10 (15)</td>
<td>7 (70)</td>
<td>3 (30)</td>
</tr>
<tr>
<td>All Tamponade</td>
<td>66 (100)</td>
<td>29 (44)</td>
<td>37 (56)</td>
</tr>
<tr>
<td>HWI</td>
<td>56 (100)</td>
<td>31 (55)</td>
<td>25 (45)</td>
</tr>
</tbody>
</table>

*HWI indicates hot-water irrigation. There was no significant difference between the all tamponade and HWI groups.
†Manufacturers information is given in the “Tamponade Treatment” subsection of the “Results” section.

Table 2. Pain Scores Correlated to Different Types of Tamponade and HWI Treatment

<table>
<thead>
<tr>
<th>Tamponade Type†</th>
<th>Mean VAS Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At Treatment</td>
</tr>
<tr>
<td>Epistat</td>
<td>7.1</td>
</tr>
<tr>
<td>Foley</td>
<td>8.9</td>
</tr>
<tr>
<td>Mesh</td>
<td>9.0</td>
</tr>
<tr>
<td>Merocel</td>
<td>6.7</td>
</tr>
<tr>
<td>Simpson</td>
<td>7.3</td>
</tr>
<tr>
<td>All tamponade</td>
<td>7.5★</td>
</tr>
<tr>
<td>HWI</td>
<td>4.7</td>
</tr>
</tbody>
</table>

★HWI indicates hot-water irrigation; VAS, visual analog scale (using 10-cm scale).
†Manufacturers information is given in the “Tamponade Treatment” subsection of the “Results” section.
‡P = .001, all tamponade group vs HWI group.
§P = .01, all tamponade group vs HWI group.
‖No significant difference.
score of 4.7. Also, the pain reported the next morning \( (P < .001) \), the next evening \( (P < .001) \), and at discharge from the hospital \( (P < .01) \) was significantly less in the HWI group compared with the tamponade group. At the visit to the clinic 1 week after hospital discharge, there was no significant difference between the groups.

Of the 21 patients having both the HWI and the tamponade treatment, 10 patients completed the VAS after both treatments. In all cases, the patients indicated more pain during the tamponade treatment (mean score, 8.0) than during the HWI treatment (mean score, 4.7).

## DURATION OF HOSPITAL STAY

The mean stay in the hospital for patients in the HWI group was 2.9 days (range, 1-10 days) compared with 4.0 days (range, 1-11 days) in the tamponade group, which was significant \( (P < .05) \). Among the 31 patients in the HWI group who were discharged from the hospital with no need for further treatment, the mean stay was 1.9 days (Table 3) compared with 2.8 days in the corresponding tamponade group of 29 patients (Table 4).

## RHINOSCOPIC FINDINGS

Of the patients in the HWI group who, apart from the actual nosebleed, had normal rhinoscopic findings on admission and who had only HWI treatment during the hospital stay, 86% had normal rhinoscopic results at dis-
charge from the hospital (Table 5). The corresponding figure for the tamponade group was 33%. Necrosis of parts of the nasal mucosa was seen in 16% of the patients in the tamponade group compared with none in the HWI group.

At the clinic visit 1 week after hospital discharge, only 17% in the tamponade group had normal rhinoscopic findings compared with 95% of the patients treated with HWI exclusively. In the tamponade group, necrosis of the nasal mucosa occurred in 40% of the patients. The most traumatic tamponade type was the Epistat catheter, where necrosis or synchia was seen in 67% of patients. In patients treated with the Simpson Epistaxis Plug balloon tamponade, none of the patients had necrosis of the nasal mucosa (Table 5).

**COMMENT**

Most patients with posterior epistaxis are elderly patients, and immobilization in a hospital bed for even a few days can increase the risk for complications and morbidity. In addition, the traditional tamponade treatment involves troublesome breathing with possible sleep apnea. Complications in the form of crust formation and necrosis of parts of the nasal mucosa and ala of the nose are not rare occurrences after some days with a firm nasal tamponade.

That the HWI treatment is less painful than tamponade treatment is demonstrated by the VAS scores given by the patients who experienced both treatments. All of these patients indicated less pain during HWI than during the tamponade treatment. Furthermore, HWI treatment is significantly less traumatic to the nasal mucosa than the tamponade treatment. Severe mucosal changes, including necrosis and synchia of the nasal mucosa, were seen in 16% of the noses after tamponade treatment compared with none after HWI treatment.

The mean tamponade period, which equals the period of impaired nasal breathing and risk of sleep apnea, was 3.7 days in the tamponade group compared with a maximum of 30 minutes in patients treated with HWI.

The mechanism of the hemostatic effect of HWI cannot be determined on the basis of the present study. In an experimental study, rabbits were subjected to nasal irrigation with fresh water ranging in temperature from 40°C to 60°C. No changes were recorded after irrigation with water at 40°C to 46°C. At temperatures above 46°C, vasodilatation and edema of the mucosa occurred with subsequent narrowing of the intranasal lumen. Severe changes, including epithelial necrosis, occurred only after irrigation with water of 52°C or warmer. The conclusion of the study was that the hemostatic effect of the HWI was caused by (1) edema and narrowing of the intranasal lumen, creating internal and external compression of the leaking vessel; (2) vasodilatation of the mucosal vessels, decreasing the flow and the intraluminal blood pressure; and (3) cleaning of blood coagulates from the nose. Another possible mechanism of the hemostatic effect could be that the increase in temperature increases the speed of the clotting cascade.

In conclusion, in patients with posterior epistaxis, HWI is at least as effective as traditional tamponade treatment. Moreover, HWI treatment is less painful, and patients, especially the elderly, can be discharged from the hospital sooner. The treatment is significantly less traumatic to the nasal mucosa compared with the different kinds of tamponade treatments used in the present study.

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The prototype of the catheter was produced and sponsored by Willy Rush AG, Stuttgart, Germany. The rights for the catheter are held by Dr Stangerup.

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**REFERENCES**