Ximelagatran Versus Warfarin for Stroke Prevention in Patients With Nonvalvar Atrial Fibrillation

SPORTIF II: A Dose-Guiding, Tolerability, and Safety Study

Palle Petersen, MD, DMSc, FCCP,* Margaretha Grind, MD, PhD, † John Adler, MSc, ‡ for the SPORTIF II Investigators
Copenhagen, Denmark; Loughborough, United Kingdom; and Mölndal, Sweden

OBJECTIVES
We sought to compare the tolerability and safety of three fixed doses of ximelagatran versus warfarin in patients with nonvalvar atrial fibrillation (NVAF).

BACKGROUND
Anticoagulants such as warfarin lower the risk of stroke in patients with NVAF. Ximelagatran is a novel, oral direct thrombin inhibitor with predictable pharmacokinetics and no known food or pharmacokinetic drug interactions.

METHODS
This was a 12-week, randomized, parallel-group, dose-guiding study of NVAF patients with at least one additional risk factor for stroke. The primary end point was the number of thromboembolic events and bleedings. Three groups received ximelagatran (n = 187) at 20, 40, or 60 mg twice daily, given in a double-blind fashion, without routine coagulation monitoring. In a fourth group, warfarin (n = 67) was managed and monitored according to normal routines, aiming for an International Normalized Ratio of 2.0 to 3.0.

RESULTS
A total of 254 patients received study drug. One ischemic stroke (nonfatal) and one transient ischemic attack (TIA) occurred in the ximelagatran group. Two TIs occurred in the warfarin group. No major bleedings were observed in the ximelagatran group. One major bleed occurred in a warfarin-treated patient. The number of minor and multiple minor bleeds was low, but there was a slight increase by ximelagatran dose. The 60-mg dose resulted in the same number of bleeding events as that with warfarin. S-alanine aminotransferase was increased in eight patients (4.3%) taking ximelagatran, but normalized with continuous treatment or cessation of the drug.

CONCLUSIONS
Fixed oral doses of ximelagatran up to 60 mg twice daily were well tolerated, without the need for dose adjustment or coagulation monitoring. (J Am Coll Cardiol 2003;41:1445–51) 

© 2003 by the American College of Cardiology Foundation

Atrial fibrillation (AF) is the most frequent arrhythmia in clinical practice and is the strongest independent risk factor for stroke (1,2). Approximately 50% of all cardiogenic and systemic emboli occur in individuals with AF. Atrial fibrillation occurs in <1% of individuals below 50 years of age, increasing to up to 10% in people over 75 years of age (3). Stroke occurs in approximately 5% of the nonvalvar AF (NVAF) patient population in the range of two to seven times that of people without AF, but this figure increases to 12% if the patient has had a previous stroke or transient ischemic attack (TIA) (2).

The benefits of treatment with oral warfarin in reducing the risk of stroke in patients with NVAF have been well established by multiple randomized trials. In a meta-analysis of five studies, anticoagulation with warfarin produced a 62% relative risk reduction for stroke, compared with placebo (4–9), and this benefit accrued for either primary or secondary prevention (10,11). Indeed, long-term oral anticoagulation therapies in patients with NVAF who have one or more additional risk factors for stroke are supported by several published guidelines (3,12).

Aspirin at doses between 75 and 325 mg/day has also been reported to reduce the risk of stroke in patients with NVAF, although the risk reduction is less than that with warfarin. In one meta-analysis, the relative risk reduction for stroke was 22% after aspirin treatment compared with placebo (4). Current treatment guidelines therefore suggest aspirin rather than warfarin for NVAF patients with a low risk of stroke (i.e., those <60 years of age or those without additional risk factors) (3,12). Higher risk patients who are treated with aspirin instead of warfarin remain at a significant disadvantage in terms of ongoing stroke risk (4).

Ximelagatran (Exanta; AstraZeneca, Mölndal, Sweden) is a novel, oral direct thrombin inhibitor that inhibits the final step in the coagulation process—namely, the conversion of fibrinogen to insoluble fibrin by thrombin. Ximelagatran is converted to its active form, melagatran, after oral administration. Consistent pharmacokinetic properties make the need for dose titration or routine coagulation monitoring unnecessary, creating advantages that are likely to increase compliance with ximelagatran treatment compared with currently available anticoagulants (13). This 12-week study of ximelagatran in patients with chronic
NVAF with a medium to high risk of stroke is the first to investigate the tolerability (with special regard for thromboembolic events and bleedings) and safety of three fixed, oral doses of ximelagatran (20, 40, and 60 mg twice daily) compared with dose-adjusted warfarin (aiming for an International Normalized Ratio [INR] of 2.0 to 3.0).

**METHODS**

**Patients.** Patients at least 18 years of age with a history of chronic, i.e., intermittent (paroxysmal) or persistent NVAF verified by at least two electrocardiograms within the previous year, plus at least one of the defined risk factors for stroke and without any of the exclusion criteria listed in Table 1, were enrolled into the study. Treatment with either nonsteroidal anti-inflammatory drugs or fibrinolytic agents within the week before the start of the study was prohibited. Aspirin was not recommended in the study, but low doses (up to 160 mg/day) could be used at the investigators’ discretion. Apart from the drugs previously specified, no other drugs were prohibited.

**Study protocol.** The Stroke Prevention by ORal Thrombin Inhibitor in atrial Fibrillation (SPORTIF II) trial was a prospective, multicenter, randomized, parallel-group, dose-guiding study performed at 37 centers in 11 countries in Europe and U.S. The duration of the study was 12 weeks. Patients were randomized using a computer-generated schema into four groups, resulting in a 1:1:1:1 block randomization. Complete blocks were distributed to the centers, from which patients were allocated in consecutive order. Patients in three groups received fixed doses of 20, 40, or 60 mg twice daily of oral ximelagatran in a double-blinded manner. No loading doses or dose titrations were used. Dose-adjusted warfarin (aiming for an INR of 2.0 to 3.0) was given to the fourth group in an open-label fashion and managed according to each center’s normal clinical routine (Fig. 1).

Patients previously receiving warfarin and who were randomized to ximelagatran interrupted warfarin treatment and began ximelagatran once the INR value was at or below 1.5. This was achieved by taking no drug at all, by receiving 2 mg vitamin K orally to reverse the effect of warfarin, or by administering low-molecular-weight or unfractionated heparin until the INR had reached 1.5 or below. At the end of the study, patients who stopped ximelagatran began warfarin therapy 12 to 24 h after the last dose of ximelagatran. After a two-week run-in period, all patients attended the clinic at randomization, at 0.5, 1, 2, 4, 8, and 12 weeks of treatment, and 2 weeks after cessation of treatment. Local ethics committees approved the study, and all patients gave written, informed consent to participate in the study. The study was performed in accordance with the ethical principles defined in the Declaration of Helsinki.

**End points and outcome events.** All strokes and TIA that occurred during the study were assessed centrally by computed tomography or magnetic resonance imaging scans and classified by an independent neuroradiologist blinded to study treatment as ischemic, ischemic with hemorrhagic transformation, or primary hemorrhagic stroke. The severity of the stroke was assessed according to the modified Rankin scale (14) and the Barthel index of activities of daily living (15) three months after the event.

Safety was assessed by monitoring for bleeding events and adverse events (AEs), clinical chemistry, hematology, uri-

### Table 1. Summary of Principal Inclusion and Exclusion Criteria

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of hypertension</td>
<td>Stroke and/or systemic embolism within the previous 2 years</td>
</tr>
<tr>
<td>Age ≥65 yrs</td>
<td>Conditions associated with increased risk of bleeding</td>
</tr>
<tr>
<td>Previous stroke or TIA</td>
<td>NVAF secondary to other reversible disorders (e.g., thyrotoxicosis)</td>
</tr>
<tr>
<td>Previous systemic embolism</td>
<td>Presence of mechanical heart valves</td>
</tr>
<tr>
<td>Left ventricular dysfunction (either LVEF &lt;40% or symptomatic CHF within 3 months)</td>
<td>Myocardial infarction, CABG, or PTCA within previous 3 months</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>Diagnosis of left ventricular aneurysm or atrial myxoma</td>
</tr>
<tr>
<td>Coronary heart disease</td>
<td>Treatment with either NSAIDs or fibrinolytics within previous week</td>
</tr>
<tr>
<td></td>
<td>Renal impairment (calculated creatinine clearance &lt;40 ml/min)</td>
</tr>
<tr>
<td></td>
<td>Systolic/diastolic blood pressure &gt;180/100 mm Hg</td>
</tr>
<tr>
<td></td>
<td>History of rheumatic fever</td>
</tr>
<tr>
<td></td>
<td>Liver insufficiency</td>
</tr>
<tr>
<td></td>
<td>Hemoglobin &lt;100 g/l or platelet count &lt;100,000</td>
</tr>
<tr>
<td></td>
<td>Contraindications to warfarin treatment</td>
</tr>
</tbody>
</table>

CABG = coronary artery bypass grafting; CHF = congestive heart failure; LVEF = left ventricular ejection fraction; NSAIDs = nonsteroidal anti-inflammatory drugs; PTCA = percutaneous transluminal coronary angioplasty; TIA = transient ischemic attack.
nary erythrocytes (U-Hb), and fecal hemoglobin (Fe-Hb). Blood samples for safety parameters (i.e., hematology and clinical chemistry) were taken at baseline and at 2, 4, 8, and 12 weeks. A central laboratory (BARC Laboratory, Ghent, Belgium) analyzed all samples. Bleeding events were identified by three methods—specific questioning at each visit; AE reporting; and review of the clinical laboratory reports—and were categorized as major or minor according to the following criteria: 1) clinically overt; 2) critical site (e.g., intracranial, retroperitoneal, intraocular, spinal, or pericardial); 3) bleeding index (number of units transfused and a drop of $\geq 2.0 \text{ Hb (g/dl)}$ before and after the bleed); and 4) need for medical or surgical intervention.

A “major bleed” was defined as satisfying criterion 1 in combination with any of criteria 2, 3, or 4, and a “minor bleed” as satisfying criterion 1 and none of criteria 2, 3, or 4. Bleeding detected by U-Hb and Fe-Hb dipstick testing was reported separately.

An independent Data Safety Monitoring Board (DSMB) was established to monitor patient safety in the study (i.e., all AEs, withdrawals, major bleeds, and strokes/TIs). The DSMB reviewed the progress of the study for safety concerns after 100, 200, and 400 patient-months of drug treatment. The DSMB could recommend to the principal investigator and the sponsor whether or not study treatment should be terminated for any safety concerns.

**Pharmacokinetics and pharmacodynamics.** The pharmacokinetic data from this study will be reported separately (16). The pharmacodynamic profiles of both ximelagatran and warfarin were investigated using activated partial thromboplastin time (aPTT) and INR assays, respectively. For patients receiving ximelagatran, aPTT was analyzed centrally (BARC Laboratory). For those receiving warfarin, the INR was analyzed locally.

**Statistical analysis.** The tolerability and safety of the three ximelagatran dose levels were assessed exploratively, with the warfarin group as a reference. Data from a sample size of a total of 220 patients randomized in equal numbers to one of three different dose levels of ximelagatran or warfarin to achieve 50 evaluable patients in each of the four treatment groups was considered sufficient to allow for the detection of important tolerability and safety events (e.g., those with minor and major bleeding during any of the four treatment regimens), although no formal statistical power calculation was performed for this dose-guiding study. All statistical analyses were prespecified before the study treatment code was broken. In this primary analysis, the number of thromboembolic events, bleeding, and safety were compared. Descriptive statistics were used in the study, according to the intention-to-treat principle. The final statistical analyses and reporting of the data were performed by the sponsor in collaboration with the authors.

**RESULTS**

**Patient demographics.** A total of 257 outpatients were randomized into the study over a period of approximately four months, and 254 patients began treatment. Patient demographic data were well balanced across the four treatment groups (Table 2). The mean age of the patients was 69.5 years (range 39 to 95), 72% of whom were at least 65 years of age and 27% aged 75 years or older. There were 154 males in the study. Atrial fibrillation was present for more than a year in 73% of patients prior to enrollment and was persistent in 94% of patients. Cardioversion had been attempted before entry in 34% of the patients.

Patients’ past or current medical histories and concomitant medication usage were evenly distributed across the
Table 2. Summary of Patient Demographics

<table>
<thead>
<tr>
<th></th>
<th>Ximelagatran Group</th>
<th></th>
<th>Warfarin Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20 mg bid (n = 66)</td>
<td>40 mg bid (n = 62)</td>
<td>60 mg bid (n = 59)</td>
<td>(INR 2.0–3.0) (n = 67)</td>
</tr>
<tr>
<td>Median age (yrs)</td>
<td>70</td>
<td>69</td>
<td>69</td>
<td>71</td>
</tr>
<tr>
<td>Mean weight (kg)</td>
<td>85</td>
<td>85</td>
<td>82</td>
<td>80</td>
</tr>
<tr>
<td>Males (%)</td>
<td>65</td>
<td>68</td>
<td>54</td>
<td>55</td>
</tr>
<tr>
<td>History of hypertension (%)</td>
<td>62</td>
<td>55</td>
<td>61</td>
<td>51</td>
</tr>
<tr>
<td>No. of risk factors in addition to AF, n (%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1 (1)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>15 (23)</td>
<td>19 (31)</td>
<td>12 (20)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>24 (36)</td>
<td>23 (37)</td>
<td>16 (27)</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>16 (24)</td>
<td>10 (16)</td>
<td>21 (36)</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>6 (9)</td>
<td>8 (13)</td>
<td>7 (12)</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>4 (6)</td>
<td>2 (3)</td>
<td>3 (5)</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>1 (2)</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

AF = atrial fibrillation; bid = twice daily; INR = International Normalized Ratio.

Treatment groups. The most common current medical conditions were hypertension (57%), coronary heart disease (43%), left ventricular dysfunction (31%), and diabetes mellitus (21%). During the study, patients took betablockers, angiotensin-converting enzyme inhibitors, and calcium antagonists. At study entry, 155 patients (61%) had taken vitamin K antagonists, and 45 (18%) used aspirin at entry, compared with 4 patients (2%) during the trial.

In addition to NVAF, all but one of the patients (99.6%) had at least one additional risk factor for stroke or TIA, 75% of patients had at least two additional risk factors, 42% had three or more risk factors, and one patient had six risk factors (Table 2), thus indicating a moderate- to high-risk patient population. The most common combinations of risk factors in addition to NVAF were age ≥65 years (14.6%), age ≥65 years and hypertension (11.8%), age ≥65 years, hypertension and coronary heart disease (7.1%), and hypertension (4.7%).

Patient disposition. Of 257 patients randomized, 207 completed the study. Fourty-seven patients discontinued assigned treatment prematurely, 18 owing to AEs. There was no notable difference in the rates of withdrawal from the ximelagatran and warfarin groups. Four patients discontinued for more than one reason. One patient in the 20-mg ximelagatran group and two patients in the warfarin group discontinued due to AEs and a lack of eligibility criteria. One patient in the 60-mg ximelagatran group did not meet the eligibility criteria and was withdrawn from drug treatment.

Compliance. Mean compliance was 100%, 96%, and 98% for the 20-, 40-, and 60-mg ximelagatran groups, respectively, as assessed by returned tablet counts.

Warfarin control. Attainment of optimal INR values (2.0 to 3.0) increased from 34% of patients at the start of the study to 57% after 12 weeks (Fig. 2). The INR was also assessed, off-protocol, in two patients receiving ximelagatran who had an INR of approximately 2.0.

Clinical events. No systemic embolic events were reported during the study. Four neurologic events occurred, one of which was a nonfatal ischemic stroke and the other three TIAs (Table 3). The patient experiencing an ischemic stroke had five risk factors in addition to NVAF (previous TIA, hypertension, coronary heart disease, left ventricular dysfunction, and diabetes mellitus); he was assigned to 60 mg ximelagatran and has developed persistent aphasia. The three patients who experienced TIA were older than 65 years of age. One patient who received warfarin had four additional risk factors (≥65 years of age, hypertension, left ventricular dysfunction, and diabetes mellitus), and two had one risk factor (≥65 years of age). None were taking aspirin before or during the study.

The total number of bleeds was low in all four treatment groups. No fatal or critical-site bleeds occurred. Of the 254 patients who received the study drug, 231 (91%) experienced no bleeding. One major bleed (vaginal) occurred after two months of warfarin treatment in an 82-year-old female patient, who recovered without sequelae. No major bleeding occurred in the patients taking ximelagatran.

Minor and multiple minor bleeds consisted mainly of hematuria, purpura, epistaxis, hematomas after venipuncture, gingival bleeding, or rectal bleeding. These occurred in four, five, and seven patients receiving ximelagatran 20-, 40-, and 60-mg, respectively, compared with six patients in the warfarin group. Figure 3 represents the time of onset and cumulative number of patients experiencing any bleeding since randomization. Numerically, there were fewer bleeds in the 20- and 40-mg ximelagatran treatment groups, compared with the 60-mg ximelagatran and warfarin groups, and they accumulated more slowly during the 12-week treatment period in this study. Most bleeds in the latter two groups occurred within two weeks after the start of the study. There was no statistically significant correlation between bleeding and either creatinine clearance or age in any of the four groups.

General safety. In general, both ximelagatran and warfarin were well tolerated in this NVAF patient population. In total, 97 (51.9%) and 33 (49.3%) patients in the ximelagatran and warfarin groups, respectively, did not report any
AEs. During active treatment, AEs were reported by 90 ximelagatran-treated patients (48.1%) and 34 warfarin-treated patients (50.7%). None of the AEs were dose-related. A total of 16 patients (8.6%) discontinued ximelagatran, and six patients (9%) discontinued warfarin therapy due to AEs. The most common AEs experienced by patients are detailed in Table 4. One patient (82 years old) with a medical history of hypertension, chronic bronchitis, gastritis, colic, agitation, and hypokalemia, who received 20 mg ximelagatran, died from multiorgan failure, secondary to lung disease, but this was considered unlikely to be related to ximelagatran.

Eight of 187 patients (4.3%) experienced a transient increase in liver enzymes, defined as a level of S-alanine aminotransferase (S-ALAT) above three times the upper limit of normal, after four to eight weeks of treatment with ximelagatran. The S-ALAT levels normalized with continued treatment in five patients and after drug withdrawal in three patients. All eight patients were asymptomatic, and the elevations did not appear to be dose-related. No patient on warfarin showed a similar increase in S-ALAT levels.

Urine erythrocytes (U-Hb) were positive in 22 patients (i.e., 5, 5, 4, and 8 patients in the 20-, 40-, and 60-mg ximelagatran, and warfarin treatment groups, respectively). Fecal hemoglobin was seen in a total of 22 patients (i.e., 6, 4, 7, and 5 patients in the 20-, 40-, and 60-mg ximelagatran, and warfarin treatment groups, respectively). Thus, there was no real difference between the different doses of ximelagatran compared with warfarin. No other significant clinical or laboratory abnormalities were seen.

**Pharmacodynamics.** The aPTT increased with increasing ximelagatran doses; there was a nonlinear relation to the plasma concentration of melagatran ($r^2 = 0.43$).

**DISCUSSION**

The oral direct thrombin inhibitor ximelagatran has previously been found to be efficacious and well tolerated for the prevention of deep vein thrombosis in patients undergoing orthopedic surgery (17,18). SPORTIF II is the first long-term treatment study of ximelagatran in fixed, oral doses for the prevention of stroke and systemic embolic events in patients with NVAF. The study population was similar to previous larger cohorts of patients with NVAF in studies of warfarin for stroke prevention, with patient characteristics balanced across the four treatment groups. All but one of

| Table 3. Characteristics of Patients Experiencing Stroke or TIA |
|------------|---------|---------|-------------|--------|
| Gender     | Age (yrs) | Stroke/TIA | Previous Stroke | Previous TIA |
| Ximelagatran (60 mg bid) | Male | 63 | Ischemic* | No | Yes |
|            | Male | 65 | TIA | No | No |
| Warfarin   | Male | 73 | TIA | No | No |
|            | Female | 71 | TIA | No | No |

*This patient had four risk factors for stroke: previous TIA, hypertension, left ventricular dysfunction, and diabetes.

**bid** = twice daily; TIA = transient ischemic attack.
the patients in the randomized population had at least one additional risk factor for stroke or TIA and would therefore be selected for long-term oral anticoagulation, according to current treatment guidelines.

Owing to treatment with warfarin prior to inclusion into the study, 34% of warfarin-treated patients had INRs within the target range at the initiation of the study. However, the INR improved with time, and approximately two-thirds of the warfarin group was maintained in the therapeutic window of an INR of 2.0 to 3.0 at the end of the study. Based on earlier observations, INR levels seem to improve in patients under controlled conditions, such as in clinical trials. This study documents that control of warfarin levels was consistent with what might be expected in a well-run anticoagulation clinic. The INR assays are designed to evaluate the effect of warfarin on the activity of vitamin K-dependent coagulation factors and cannot be used to monitor therapy with thrombin inhibitors such as ximelagatran (19). Our experience and data from this study, undertaken without dose adjustment or coagulation monitoring and with no increase in bleeding events in ximelagatran-treated patients during 12 weeks of treatment, support the evaluation of ximelagatran without routine coagulation monitoring in larger trials of patients with NVAF.

Two clinical events (one TIA and one nonfatal ischemic stroke) occurred in patients receiving ximelagatran (both in the 60-mg group), and two events (TIA) occurred in the warfarin group. There were no thromboembolic events in the 20- or 40-mg ximelagatran groups and no systemic embolic events in any patient group. Interpretation of these findings from this short-term study is limited, and long-term studies involving considerably larger patient populations are ongoing.

Bleeding is an expected AE in trials of anticoagulant drugs, and in this respect, there was no significant difference between ximelagatran and warfarin during this 12-week study. There was a slightly higher rate of minor bleeding with increasing ximelagatran dose, although no statistically significant differences were detected between the groups, and the same number of bleeding events occurred in the 60-mg ximelagatran group as in the warfarin group. No obvious clinical factors (e.g., age, body weight, creatinine clearance) identified patients susceptible to bleeding during treatment.

Asymptomatic elevation in S-ALAT levels developed in 4.3% of patients treated with ximelagatran after four to eight weeks. All values normalized whether treatment was interrupted or continued. The mechanism of action responsible for this finding is not understood, but a similar experience has been reported with unfractionated and low-molecular-weight heparins (20). This phenomenon is being
further investigated in ongoing and planned long-term studies of ximelagatran.

Conclusions. Fixed, oral doses of ximelagatran up to 60 mg twice daily were well tolerated, without the need for dose adjustments or coagulation monitoring, during a three-month treatment period in NVAF patients at risk for stroke and systemic embolism. This small, dose-guiding study has several limitations, including a small sample size, a short assessment period, and noncentrally adjudicated bleeding events (although this would be expected to reduce the number of bleeding events reported). In addition, as warfarin was given in an open-label fashion, there may have been a potential for bias. However, larger clinical trials are ongoing to compare ximelagatran with warfarin for long-term prophylaxis against stroke and systemic embolic events in patients with AF.

Acknowledgments
The authors would like to acknowledge S. Partridge and A. Goodvin from AstraZeneca.

Reprint requests and correspondence: Dr. Palle Petersen, Department of Neurology, University State Hospital, Rigshospitalet, Blegdamsvej 9, DK-2100 Copenhagen, Denmark. E-mail: pape@rh.dk.

REFERENCES


APPENDIX

Investigators (no. of patients): Belgium: J. Vanderdonckt (8); Czech Republic: O. Mayer (28), O. Jerebek (20), P. Matejovsky (6), J. Bultas (4); Denmark: K. Pedersen (10), E. Agner (9), S. Husted (6); Finland: M. Halinen (7), J. Rummukainen (6); France: P. Larrieu (16), J. Aubry (9), S. Godard (6), G. Montalescot (3), H. Lardoux (1); Germany: W. Sehnert (3); Norway: P. Sandset (4), A. Johansen (5), K. Andersen (6); Poland: G. Opolski (16), W. Tomkowski (12), P. Kolodziej (12), A. Malinski (12), Z. Gaciong (11); Sweden: B. Olsson (13); United Kingdom: G. Ford (6), T. Robinson (4); United States: G. Flaker (10), M. Ezekowitz (3), G. Albers (2).