

**INCO-DEV : International Cooperation with Developing Countries
(1998-2002)**

Contract number : ICA2-CT-2002-1005

Ist YEAR REPORT

Start date : Nov. 02

Duration : 12 months

Title : Reducing mortality and long-term disability of TBI victims through research into treatment procedures used in Bosnia-Herzegovina, Macedonia and Croatia. RESEARCH TREAT TBI

Project homepage : http://www.igeh.org/project4_1_1.php

Keywords : (5 maximum) Balkans, CEEC, Brain Injuries, Evidence Based Medicine

Shared-Cost Rtd

Contract number : ICA2-CT -2002-10005

TITLE : Reducing mortality and long-term disability of TBI victims through research into treatment procedures used in Bosnia-Herzegovina, Macedonia and Croatia RESEARCH TREAT TBI

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Contents

1	Summary of the final report	7
2	Consolidated scientific report	8
2.1	Objectives	8
2.1.1	General objectives	8
2.1.2	Specific Objectives for the first year of the project	8
2.2	Activities	9
2.3	Results achieved	10
2.3.1	Retrospective dataset	10
2.4	Problems encountered	11
2.5	Technology implementation plan	12
2.6	Publications and papers	12
2.7	Conclusion	12
3	Management report	13
3.1	Organisation of the collaboration	13
3.2	Meetings	13
3.2.1	The 1 st Workshop	13
3.2.2	The 2 nd Workshop	14
3.2.3	Meeting Participant 8 – HR Zagreb	14
3.2.4	Meeting Participant 7 - HR Rijeka	14
3.2.5	Meeting Participant 5 – FYROM Skoplje	15
3.2.6	Meeting Participant 6 – HR Osijek	15
3.2.7	Meeting participant 9 – BH Sarajevo	15
3.2.8	2 nd Meeting Participant 9 – BH Sarajevo	16
3.3	Exchanges	16
3.4	Problems	16
4.	Individual partner final report	17
4.1.	Participant 2 AU Vienna Epidemiology Dr. Franz Piribauer, MD, MPH, The Center for Applied Epidemiology and Health Policy, Wien, AUstria	17
4.1.1.	Activities	17
4.1.2.	Results Achieved	17
4.1.3.	Problems encountered	17
4.1.4.	Technology implementation plan Not relevant for this activity	17
4.1.5.	Publications and papers No papers and/or publications were produced	17
4.1.6.	Conclusion	17
4.2.	Participant 3 CZ Brno	17
4.3.	Participant 4 SK Nove Zamky	17
4.3.1.	Activities	17
4.3.2.	Results Achieved	18
4.3.3.	Problems encountered	18

4.3.4.	Technology implementation plan	18
	Not relevant for this activity	18
4.3.5.	Publications and papers	18
	No papers and/or publications were produced	18
4.3.6.	Conclusion	18
4.4.	Participant 5 FYROM Skopje	18
4.5.	Participant 6 HR Osijek	18
4.5.1.	Activities	18
4.5.2.	Results achieved	18
4.5.3.	Problems encountered	19
4.5.4.	Technology implementation plan	19
4.5.5.	Publications and papers	19
4.5.6.	Conclusion	20
4.6.	Participant 7 HR Rijeka	20
4.7.	Participant 8 – HR Zagreb	20
4.7.1.	Activities	20
4.7.2.	Results achieved	20
4.7.3.	Problems encountered	21
4.7.4.	Technology implementation plan	21
4.7.5.	Publications and papers	21
4.7.6.	Conclusion	21
4.8.	Participant 9 - BH Sarajevo	22
Annexes		23
4.9.	Meetings reports	23
4.9.1.	Minutes from the 1 st Workshop	23
4.9.2.	Minutes Workshop 2	28
4.9.3.	Minutes Meeting Participant 8 – HR Zagreb	31
4.9.4.	Meeting Participant 7 - HR Rijeka	32
4.9.5.	Meeting Participant 5 – FYROM Skoplje	33
4.9.6.	Meeting Participant 6 – HR Osijek	33
4.9.7.	Meeting participant 9 – BH Sarajevo	35
4.9.8.	2 nd Meeting Participant 9 – BH Sarajevo	36
5.	Completed catalogue page	38

1 Abstract

Number of death from injuries in Bosnia-Hercegovina, Macedonia and Croatia as reported by WHO in 1998 is very high. Injuries rank number one, number two and number three killer in young population of the region (ages 5 to 44). The broad objectives of RESEARCH-TREAT-TBI project are to save the lives of traumatic brain injury (TBI) victims and to improve the quality of life of survivors through research in factors determining health outcomes of hospital care and through changing current clinical practices to provide better care. The project builds up on experiences with the research in determinants of health outcomes and in implementation of scientific based guidelines for good clinical practice. Planned Project will facilitate the research and subsequent guidelines implementation in concrete clinical settings, and reflecting local situation both clinical and public health.

Research into factors determining the quality of care for victims of severe Traumatic Brain Injuries (TBI) (Glasgow Coma Scale less than 9), accentuating the quality of life after recovery. Dissemination of state-of-the-art knowledge on quality care of Traumatic Brain Injury patients; Practical and participative implementing programs for the introduction into clinical care procedures of Scientific Evidence Based Guidelines (elaborating protocols, practice modification taking local conditions fully into consideration, behavioral change of the staff involved, collecting data on patients in order to monitor the progress so that participants can see the results of their work, and can check and revisit the assumptions on best clinical practice). The implementation of Scientific Evidence Based procedures is followed by a research in efficacy of changed medical practice. To help the countries in preserving and developing their research excellence in the field of public health.

1 Summary of the final report

(6-8 pages, with the structure of a scientific work: objectives, materials and methods, results, comments and conclusions, LITERATURE!!)

2 Consolidated scientific report

2.1 Objectives

2.1.1 General objectives

Improvements in care of Traumatic Brain Injury victims will lead to lower health costs and lower burden on society by decreasing mortality and morbidity. The disintegration of the Balkans due to war has created a specific regional problem with regard to Traumatic Brain Injuries for two main reasons: Direct and Indirect impacts of war. Direct impacts of the war – war wounds, has created a higher than average burden on the Balkan region in terms of costs of care of victims of war-related Brain Injuries. Indirect impacts are those resulting from accidents due to undetonated mines (mostly landmines), severe state of roads leading to higher rates of car accidents, and under funded and poor public health systems leading to costs related to the higher incidence of such Traumatic Brain Injury cases, and the long-term disabilities created by the Secondary Brain Insults (which are preventable), caused by the poor state of roads, poor system of post impact and in-hospital care, and poor public health policy.

- Research into factors in the Balkan region, which determine the quality of care for victims of severe Traumatic Brain Injuries (TBI) (Glasgow Coma Scale less than 9), accentuating the quality of life after recovery.
- Dissemination of state-of-the-art knowledge on quality care of Traumatic Brain Injury patients; Practical and participative implementing programs for the introduction into clinical care procedures of Scientific Evidence Based Guidelines
- Specific scientific and technological objectives
- Research the factors determining health outcomes of Traumatic Brain Injury Victims in the three Balkan countries prior to project (Control Group 1 – quantitative and qualitative analyses)
- Implementation of Scientific Evidence Based guidelines for the treatment of Traumatic Brain Injury victims
- Research the extent of implementation of the Scientific Evidence Based guidelines in the three Balkan countries after the project (Control Group 2 – quantitative and qualitative analyses)
- Comparative analysis of results of patient outcomes for Control Group 1 VS Control Group 2
- Dissemination of results to all involved parties

2.1.2 Specific Objectives for the first year of the project

Objectives for the 1st year of the project were devoted to launch the project activities and to start monitoring clinical performance of trauma centers. In particular, following objectives were defined:

- Launch, situation assessment & Traumatic Brain Injury Assessment;
- Database set up & retrospective data collection;
- Interim analyses of collected data.

2.2 Activities

During the first year of the project activities carried out were oriented to implement the objectives.

- The project was started after the contract signed and all administrative aspects necessary for the successful implementation of the project were obtained. Among the first activities taken was to inform (via emails and letters) all the participants on the fact of the kicking off the activities. The second major effort was paid to prepare the first workshop. The decision was taken to arrange the meeting in Vienna. The web site for the project was developed based on existing IGEH's web site (http://www.igeh.org/project4_1_1.php). The site includes relevant information on the project (plan, members and contacts) and reports. Workshop meetings were held over two days from the 19th to the 20th of January 2003 in Vienna to obtain information on the current situation in the participating centers, to discuss the communication policy of the project and to demonstrate the software for the ITCP system. All issues raised related to project implementation were addressed accordingly (see ANNEX I for details). At the end of the meeting the project was ready to start.
- Situation assessment & Traumatic Brain Injury Assessment were based on structured interviews with representatives of all participating centers. Collected information was recorded into an Excell file. Variables describe individual characteristics of centers, such as structures providing prehospital trauma care (ambulances, personnel, equipment); hospital care facilities (numbers of beds, personnel, available technologies) as well as the catchments area and a level of services.
- Database set up & retrospective data collection started with an introduction to the ITCP database and supplemented with hands-on training in data collection using ITCP database. Subsequently 2 MDs (neurosurgeon and intensivist) were selected to be responsible for data collection – retrospectively from patients' records in 2000 and 2001. There were at least 2 people trained in data entry for each centre. Some centres trained more than 2, usually they involved a nurse to carry on the basic data entry and MDs then added CT images or surgery description. Since this part of the project was based on collection of historic data (retrospective from patients records) this approach was feasible. Under the project budget computers were provided to centers 5 – 9 in order to facilitate the collection of data. During the respective visits a computer meeting the specifications necessary to each center was purchased and installed. Data were punched into ITCP for years 2000-2001 (inclusion criteria for patients: assessment of the patient within 12 hours after injury and Glasgow Coma Scale below 9). The uniformity of the data collection is being maintained using tests on quality of data and tests on CT readings. The database was maintained by IGEH staff. The service comprises regular checking on quality of data (missing data, errors) and communication with centers to select or modify entries. Regular (monthly) reports were sent to centers informing them on current monthly figures (total patients inputted during the month, list of erroneous or missing data) and totals for the entire project. The database was installed in all centres. New hardware was purchased to support the data entry. New version of the database was sent to all centres in March and all of them have upgraded with no problems. Regular maintenance of data (back-

ups, copying, antivirus protection, reporting) was carried on by IGEH IT staff. Consultations were provided on demand. Several suggestions from centres were already included into the latest version. Some more suggestions will be implemented into the one to come next year. No data were lost.

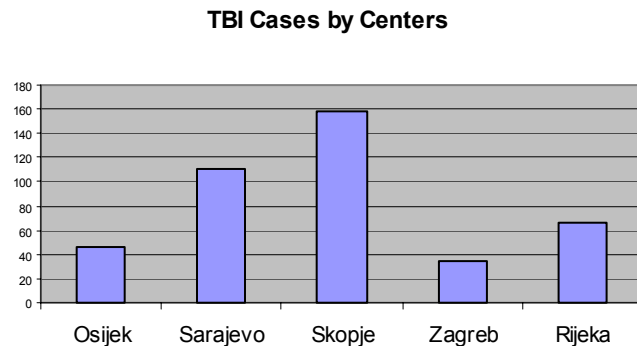
- Interim analyses of collected data. The data set was transferred to Excel format. As the first step basic data cleaning was performed. The second step was to convert all measurements to common SI units. Data were analyzed using built in Excel functions as well as XLSTAT statistical package.

2.3 Results achieved

2.3.1 Retrospective dataset

Data collected up to November 2003 formed the retrospective data set. This set will be used as the baseline data for further analysis.

CENTER	TOTAL	%
Osijek	46	11.08
Sarajevo	110	26.51
Skopje	159	38.31
Zagreb	34	8.19
Rijeka	66	15.9
TOTAL	415	100



Most of the cases are from Sarajevo and Skopje, what complies with local situation.

2.3.2 Results from interim analysis

The interim analysis was provided with an aim to evaluate quality of collected data as well as to identify areas to focus on for more complex analysis. Efforts were oriented towards following issues:

- Factors leading to brain trauma (by age, sex and center);
- Factors of the first aid and transport (by centers);
- Variables related to severity and character of the injury (by centers);
- Characteristics of clinical care provided (by centers);
- Outcomes (by centers).

Standard tabulations with frequencies calculations were provided by means of Excell program.

The analysis provoked a discussion on individual parameters and was instrumental for identification of incorrect data.

More detailed analysis will be provided later on.

2.4 Problems encountered

The original plan to have the first workshop in Zagreb was changed. The first workshop was held in Vienna which allowed participants to visit the Europe leading trauma centre – Lorenz Bohler Unfall Krankenhaus. The hospital is an example of up-to-date trauma care not only in technical equipment but especially in terms of organization of trauma care. This hospital example was already followed in many countries of Europe. Due to the problems with visa the second meeting was held in Bratislava, Slovakia. That also provided an opportunity to visit a hospital where good level of trauma care is provided under less favourable conditions compared to the previous one. In both instances the planned contents of meetings was followed precisely and results were not effected because of changed location.

Original plan was built with a vision to use TBI_trac™ database to collect data. However, over time, the IGEH developed new version of this database under new label: ITCP. This stands for International Traumatic Coma Program. The name suggests some of the differences from the previous one. While TBI_trac™ was developed as a tool to follow up compliance with TBI guidelines in national hospitals, the ITCP is more research orientated. In particular it allows for truly international cooperation (language versions), it supports different measurement units, it follows patients outcome up to 180 days. In addition is heavily focused on standardization of data, specifically emphasising assessment of general trauma, concomitant diseases and international classifications of diseases and symptoms. Therefore any analysis done using data collected by this mean has higher inferential value compared to the previous one.

The timing of work packages was not significantly changed. Surprisingly more data was collected then it has been expected.

Resource Schedule - there were no changes to the resources schedule as it applies to the entire duration of the project.

Work packages - there were no changes to work packages required.

2.5 Technology implementation plan

This is not relevant for this stage of the project

2.6 Publications and papers

Rusnak, M.: Traumatic Brain Injuries – EU Balkan Project. BIT conference, Wien, Jan. 2003.

Mauritz, W., Rusnak, M., and Janciak, I.: Implementing Scientific Evidence-Based Guidelines: Case Study of Severe Traumatic Brain Injuries. Clinical Research and Regulatory Affairs Vol. 20(1), 2003, 81-87

P. Brezany, A.M. Tjoa, M. Rusnak, J. Brezanyova, I. Janciak: Knowledge Grid Support for Treatment of Traumatic Brain Injury Victims. In: Computational Science and Its Applications – ICCSA 2003 International Conference Montreal, Canada, May 18-21, 2003. Proceedings, Part II Springer-Verlag Berlin Heidelberg 2003, pp. 446 – 455.

Rusnak, M., Mauritz, W., Urbansky, M.: Evidence based medicine in brain trauma care. Presentation given at the Regional Meeting of Young Anesthesiologists, Skopje, March 2003.

M. Rusnák: Evidence based medicine and neurotrauma (Medicina bazirna na činjenicama i neurotrauma) . First B&H Meeting on Neurotrauma with International Participation, September 20, 2003, Sarajevo

K. Dizdarevic: B&H and The International project of neurotrauma (BiH i internacionalni projekt za neurotraumu). First B&H Meeting on Neurotrauma with International Participation, September 20, 2003, Sarajevo

2.7 Conclusion

The project exceeded the set of indicators stated by individual work packages in number of trauma cases collected, in quality of data and in activities of all members of the project.

Changes and justifications as described above will not affect the quality of the research or the successful implementation of the project. The project will be continued according to schedule and with every achievement foreseen in the organization and methodology.

Basic assumption is that all participants will continue their roles and that enough data will be collected to start the explorations and policy development. If this assumption is kept, the project will continue without a need for major changes.

3 Management report

3.1 Organisation of the collaboration

Overview of how co-operation between partners was achieved and improved. Critical review of the level of collaboration achieved, main problems encountered and recommendations on how to improve it in future contracts.

3.2 Meetings

3.2.1 The 1st Workshop

Workshop meetings were held over two days from the 19th to the 20th of January 2003 at the hotel ARCOTEN Wimberger, Vienna to obtain information on the current situation in the CEEC centers of participants, to discuss the communication policy of the project and to demonstrate the software for the TBI-Trac™ system. All issues raised related to project implementation were addressed accordingly. All presentations are to be found at the project's web site http://www.igeh.org/project4_1_1.php. Discussion on the situation in centres revealed, that there is a need for computers to use ITCP database effectively. All the centres have opportunity to connect to the internet. Questionnaire was used to collect information on centres collecting data using ITCP database. The questionnaire was projected and interactively filled in for each of the centres. Thus all issues of interest were made known to all participants as well as discussed. The questionnaire administered during the meeting yielded more insight into the characteristics of participating centres. Those will be used to identify needs as well as to standardize results from statistical analysis. Mr. Janciak introduced the database ITCP to be used for the entire project. This represents a change to the plan, since during the project's planning period, it was expected that the TBI-trac™ will be used. Since that time IGEH developed new one, more suitable for outcome and quality of care research. It also allows for patients follow up. He indicated that the database is living product and it is developing over time. IGEH will send all the centres new versions immediately. No data will be lost with new version update. Participants were reminded, that frequent synchronization of database data with the server will secure the data against potential lost. Participants discussed the project in details and all items were elucidated in details. No open items were left. All participants agreed upon the plan of the project, time lines and procedures of reimbursement. The procedure agreed on was based on **Time Sheets**, which will be used to report time spent at the project. All participants received an example of the formulary to be used. Most of participants joined prof. Dr. Walter Mauritz for the visit to the Trauma Hospital. The hospital represents an example of trauma centres, which has been followed in number of similar ones (Budapest, Brno). Participants had an opportunity to see all the procedure line from transportation, through early resuscitation to intensive treatment units. The visit provided an example of high quality trauma facility of European style.

3.2.2 The 2nd Workshop

Workshop meetings were held over two days from the 22nd to the 23rd of November in Bratislava, Slovak Republic.

The workshop was held with several **objectives**:

- To review current state of the project and to evaluate results reached in the 1st year;
- To initiate quality control of data collected;
- To introduce and discuss individual procedures of TBI treatment based on TBI Guidelines.

The discussion was positive about results reached so far. There is more effort to be allocated to improve completeness of data collected. All items were fully covered for all participants.

Next meeting was decided to have in Rijeka at the end of May. Participants were invited to submit papers to the Prague symposium. In the final debate on long term outlooks prof. W.Mauritz: a paper should be written on the course of ICP in TBI patients and also to start developing a monograph.

In the end of the meeting a visit to Bratislava Municipal Hospital was arranged.

Participants visited Intensive Care Unit and discussed the situation in TBI management with local staff.

3.2.3 Meeting Participant 8 – HR Zagreb

Date: Wednesday, February 26th, 2003 at Rebro Hospital, Zagreb Croatia – Department of Neurosurgery

A presentation was given by Dr. Rusnak to the Neurosurgical staff of the Rebro Hospital in order to introduce them to Participant 1 – IGEH and the project. A general overview was given and all questions pertaining to the project were fielded.

A meeting was held between Dr's Rusnak, prof. J.Paladino, Dr. M. Vukic, and Dr. H. Jednacak to discuss the project in greater detail as it pertains to the Neurosurgical department of Rebro Hospital. Opportunities for future cooperation were also addressed. Dr. Rusnak, Dr. Vukic, and Mr. Janciak identified the necessary computer for the Neurosurgical department to implement this project and made all arrangements for the purchase and installation of said computer.

The visit to Participant 8: HR Zagreb was adjourned to the satisfaction of all parties.

3.2.4 Meeting Participant 7 - HR Rijeka

Date: Wednesday February 27th, 2003, Clinical Hospital Rijeka, Rijeka Croatia – Department of Neurosurgery

Meeting with Dr. Giroto and Dr. Neven Eskinja on protocol for TBI of Rijeka was explained/demonstrated to Dr. Rusnak; All doctors in ICU must use it and fill out a sheet to be controlled by Dr. Giroto or his Chief that they have used this protocol in treatment; Provision of a computer. Good quality computer was purchased and conditions for delivery and installation were confirmed; ITCP database was installed in department's computer and Dr. Giroto was instructed to use the ITCP database. One patient was fully entered and discussed. The center is ready to start entering patients. The visit to Participant 7: HR Rijeka was adjourned to the satisfaction of all parties.

3.2.5 Meeting Participant 5 – FYROM Skoplje

23/03/2003 at KARIL, Vodnjanska 17, Skopje, 1000-MKD, Macedonia. Dr. Rusnak presented an invited lecture: Rusnak, M., Mauritz, W., Urbansky, M.: Evidence based medicine in brain trauma care. The visit proceeded with a meeting with prof. Dr. Med. Maria Soljakova and prof. Dr. Med. Zorka Todorova Nikolova, Dpt. of Anesthesia and Intensive Care, KARIL, Skoplje. Issues discussed: ITCP database and data collection – 21 cases entered, very good quality of inputs, high mortality rate. Data saved on a diskette; new version demonstrated. Computer – there is an urgent need for the computer, the current one is old and slow. Two offers reviewed and one was selected to purchase with some changes in configuration incurred. Data analysis was requested, prof. Soljakova will send Ivan Janciak a list of variables they want to analyze. Time sheets were reviewed and explained the procedure. The visit to Participant 5: FYROM Skoplje was adjourned to the satisfaction of all parties.

3.2.6 Meeting Participant 6 – HR Osijek

May 21st and 22nd, 2003, Osijek

During the meeting issues of the project implementation were discussed. Dr. Muzevic is responsible for data entry. Osijek region faces many TBI cases monthly. Problems with transportation to the hospital persists.

A presentation was given by Dr. Rusnak to the Neurosurgical staff of the Osijek Hospital in order to introduce them to **Participant 1 – IGEH** and the project. A general overview was given and all questions pertaining to the project were fielded. A brief tour was given to the representatives of **Participant 1: IGEH** of the Neurosurgical department of Osijek Hospital. Dr. Muzevic was instructed to use the ITCP database. One patient was fully entered and discussed. The center is ready to start entering patients. A meeting was held between Dr. Rusnak, Dr. Splavski to discuss the project in greater detail as it pertains to the Neurosurgical department of Osijek Hospital. Opportunities for future cooperation were also addressed. Dr. Rusnak, Dr. Splavski and Dr. Muzevic identified the necessary computer for the Neurosurgical department to implement this project and made all arrangements for the purchase and installation of said computer.

The visit to Participant 6: HR - Osijek was adjourned to the satisfaction of all parties.

3.2.7 Meeting participant 9 – BH Sarajevo

June 17th and 18th, 2003, Clinical Center, Dpt. of Neurosurgery, Sarajevo

From 2 different offers the one from DNC Company was selected because of the quality of the offer and services offered. Also the value for the price was beneficial. The computer was purchased and will be delivered to the hospital in two days. 1 year full guarantee contract was signed. Afterwards a meeting with Dr. Dizdarevic went on discussing general issues related to the brain trauma policies and education in EBM in Bosnia and Herzegovina.

ITCP related issues were discussed, such as Miss. Jasmina Brahmi, the ICU nurse is responsible for collecting retrospective data; she reported a problem: when the birth date is entered then other dates will be modified erroneously; In many cases it is hard if not impossible to reconstruct the history of transportation of patients, especially if a patient was transported from a place outside of Sarajevo; They do not measure the mass of a

lesion in CT; TRISS: when the TRISS is finished the value of the first SBP disappears; Blood alcohol measurements are not provided routinely, they do not use the osmolality formulas for approximation (send the one); help on FiO2 and PaO2 should be added; Ranking of disabilities should be added to help; Synchronization with the central db is not available, because they do not have an access to Internet, but with a new computer they will receive a direct internet connection; the data were stored on a diskette and transported to Wien; Long term follow up is successful in about 60% of cases; The visit to Participant 9: BH Sarajevo was adjourned to the satisfaction of all parties. All participants agreed that another visit is important to arrange this year to facilitate the data entry.

3.2.8 2nd Meeting Participant 9 – BH Sarajevo

September 20th – 21st, 2003, Clinical Centre University of Sarajevo

The first day a presentation followed by discussion was given by Dr. Rusnak and Dr, Dizdarevic. During the meeting issues of transportation to the hospital and the notes taken by ambulance staff were discussed. Also an issue of alcohol estimation from osmolality was suggested to follow. Follow up of cases was found problematic in instances, when a patient is moved to another region. In general, the data collection works fine and the center has already almost 100 cases recorded in very good quality. The visit to Participant 9: BH Sarajevo was adjourned to the satisfaction of all parties.

3.3 Exchanges

No exchanges were planned and/or realized during this phase

3.4 Problems

Give details of any problems with management, administrative and financial aspects of the contract.

4. Individual partner final report

4.1. Participant 2 AU Vienna Epidemiology

Dr. Franz Piribauer, MD, MPH, The Center for Applied Epidemiology and Health Policy, Wien, AUstria

4.1.1. Activities

The role for the center planned for the 1st phase of the project was to focus on data processing and statistical analysis of collected data. Our experts Dr. Piribauer and Dr. Brazinova took part in the interim data analysis. The results were presented at the 2nd meeting of the project. We took an active part in preparation of meetings as well as in discussions with participants.

4.1.2. Results Achieved

Descriptive statistical analysis (tabulations, frequencies, descriptive statistical parameters and charts) of collected data from centers was performed and results were discussed during the meeting. The results were also displayed at the web site of the project.

4.1.3. Problems encountered

There were no major problems encountered during this activity. Data collected were in sufficient quality and export the ITCP database to an Excell file was performed with no major difficulties.

4.1.4. Technology implementation plan

Not relevant for this activity

4.1.5. Publications and papers

No papers and/or publications were produced

4.1.6. Conclusion

The first year of the project proved feasibility of the project approach. Initial statistical analysis demonstrated potential value for management of patients as well as indicated a set of problems participating centers have to tackle with locally. Forthcoming more detailed analysis will certainly bring up more issues to be concerned with and will provide items to be included in the policy paper to be prepared in the end of the project.

4.2. Participant 3 CZ Brno

4.3. Participant 4 SK Nove Zamky

Dr. Milan Urbansky, President of Obcianske zdruzenie pre urazy hlavy (Civic Association for Head Trauma), Nove Zamky, Slovak Republic

4.3.1. Activities

The role for the center planned for the 1st phase of the project was to focus on helping Balkan centers to implement the ITCP and the Guidelines into their clinical management of patients. However, due to Dr. Urbansky's absence in Europe for the major part of the year 2003, the role of the center was minimal. His position was replaced

by his colleagues from the center in last months of 2003, therefore during the last meeting in Bratislava they were able to start consulting their colleagues.

4.3.2. Results Achieved

No measurable results were planned for this phase.

4.3.3. Problems encountered

There were no major problems encountered during this activity.

4.3.4. Technology implementation plan

Not relevant for this activity

4.3.5. Publications and papers

No papers and/or publications were produced

4.3.6. Conclusion

The first year of the project proved feasibility of the project approach. The center will resume more active role in the second year of the project, since this is when the guidelines are to be introduced into the activity of each participating clinical center.

4.4. Participant 5 FYROM Skopje

4.5. Participant 6 HR Osijek

4.5.1. Activities

Introduction to the project was held in Vienna, January 18th 2003, when the project as well as the timetable of all activities related to the project was presented to all participants. Croatian representatives from Osijek were Dr. Bruno Splavski and Dr. Ines Takac. Since the start of the project in 2002, clinical data of patients sustained severe brain injury in the period 2001-2002 at Department of Neurosurgery Osijek University Hospital, Osijek, Croatia were collected. In 2003 the data for other 20 patients suffering severe brain injury was gathered. All patients' data were entered into the database designed by IGEH and the database was daily updated.

Dr. Martin Rusnak, the project coordinator, visited our Neurosurgical Department in May 2003, introducing the project and its goals to other members of our Neurosurgical Department, particularly mentioning its public health significance and its possible guidelines compliance. At the time, a PC computer was provided for our Department and Database software was installed. Since then clinical data of patients with severe brain injury has been entering into the database and on a weekly basis sent over the Internet to the IGEH, Vienna, for further statistical and technical processing. In November 2003 we all met in Bratislava, Slovakia, for annual review of our work, according to the project plan established at the project start.

4.5.2. Results achieved

In 2003, 24 patients with severe brain injury were treated at Department of Neurosurgery. The management protocol in accordance with the Guidelines for the management of severe head injury was strictly followed. Overall mortality rate was 60%.

Out of 40% patients who survived severe brain injury, good outcome was recorded in 50%. The results showed improvement of the outcome, as well as reduction of morbidity when compared to our results achieved in the previous years.

4.5.3. Problems encountered

In 2003 a minor problem related to entering the data into the database occurred due to the lack of first edition of database's software. This problem was solved soon. There is a permanent minor problem related to the quality of ambulance data but we hope with more education the problem can also be solved.

4.5.4. Technology implementation plan

According to the Guidelines for the management of severe head injury, a state-of-the-art treatment for patients suffering severe brain was successfully implemented at our Department as a daily routine due to cooperation between the neurosurgeons and the anesthesiologists involved.

4.5.5. Publications and papers

In 2003 we didn't publish any new paper regarding this project in indexed scientific journals. There is intention to publish the paper concerned with the topics on severe brain injury and database from this conjoined project in 2004. In the past years several papers on this topic by authors involved with the project appeared:

1. Splavski B, Saftić R, Takač I, Ivić D. ICP monitoring as indicator of severe brain injury outcome. In: Abstract Book, 3rd Congress of the Croatian Neurosurgical Society, June 6-8, 2002, Zagreb, Croatia, p 100.
2. Splavski B, Saftić R, Takač I, Ivić D, Soldo-Butković S, Radabivić B. Cerebral perfusion pressure management as an important factor influencing the outcome of severe brain injury. In: Abstracts, The first joint symposium of the national and international neurotrauma societies, October 27-November 1, 2002, Tampa, Florida, USA. *J Neurotrauma* 2002; 19(10): 1349.
3. Saftić R, Splavski B, Ivić D, Takač I, Radanović B. The increased intracranial pressure as an important negative indicator of severe head injury outcome. In: Abstracts, The first joint symposium of the national and international neurotrauma societies, October 27-November 1, 2002, Tampa, Florida, USA. *J Neurotrauma* 2002; 19(10): 1348.
4. Splavski B, Saftić R, Takač I, Soldo-Butković S, Has B. Most important predictors of outcome following severe traumatic brain injury. In: Abstracts, 12th European Congress of Neurosurgery, September 7-12, 2003, Lisboa, Portugal, p 246.
5. Saftić R, Splavski B, Saftić V. Clinical evaluation of the guidelines recommendations for treating patients with severe head injury. In: Abstracts, 12th European Congress of Neurosurgery, September 7-12, 2003, Lisboa, Portugal, p 257.
6. Splavski B, Saftić R, Ivić D, Radanović B, Jančuljak D. Main prognostic criteria in the management of severe brain injury. In: Abstracts, Posttraumatic brain contusions and lacerations: an international focus meeting, September 19-20, 2003, Rimini, Italy, p 28.

4.5.6. Conclusion

As far as our experiences are concerned, this project has met the expectations regarding the benefit of the treatment of severe head injured patients according to the Guidelines for the management of severe head injury. At the project end, it will be interesting to learn the difference of outcomes among the three countries involved in the project and compare the results achieved to the EU experience.

We believe that this project when completed will determine the main problems facing the management of severe brain injury and will offer possible variety of solutions in overcoming the encountered problems.

Bruno Splavski, MD, MS
Head, Department of Neurosurgery,
Osijek University Hospital

4.6. Participant 7 HR Rijeka

4.7. Participant 8 – HR Zagreb

Miroslav Vukic, MD, PhD

University Hospital Sestre Milosrdnice
Vinogradska street 29, 10000 Zagreb, HR Croatia

4.7.1. Activities

Introduction with the project happened in Vienna, January 18th 2003, when Dr. Rusnak, as the project leader, introduce the project as well as the time table of all activities related to the project, to all participants attended the meeting. Croatian representatives were Dr. Miroslav Vukic (national coordinator) and his associate Dr. Hrvoje Jednacak.

Since the start of the project in 2002, we first gathered clinical data on patients sustained severe head injury in the period 2001-2002 at Department of Neurosurgery University Hospital Sestre Milosrdnice, Zagreb, Croatia. In the year 2003 we gathered data on another 24 patients with severe head injury. According to our project intention all patients' data were entered into the database designed by International Neurotrauma Research Organization (IGEH), and database was daily reviewed for updates.

In March 2003 Dr. Martin Rusnak, visited our Neurosurgical Department and met the general manager of the hospital who gave him a full support in the project implementation. At that time a PC computer was provided for our Department and Database software was installed. Dr. Rusnak has also introduced the project and its goal to other members of our Neurosurgical Department, particularly mentioning its public health significance and its guidelines compliance.

From that time clinical data of patients with severe head injury has been entering into the database and on a weekly basis sent over the Internet to the IGEH, Vienna, for further statistical and technical processing.

In October 2003 we all met in Bratislava, Slovakia, for annual review of our work as was planned at the beginning of our project.

4.7.2. Results achieved

In the year 2003 we treated 24 patients with severe brain injury in our Department. Results showed the reduction of mortality and morbidity rates when compared to our results achieved in the previous years.

Overall mortality rate was 30%. Out of 70% of patients who survived severe brain injury, 40% of patients had a good outcome. Treatment stated in the Guidelines for the management of severe head injury was strictly followed. In our case we think combination of early neurosurgical treatment continued with appropriate intensive care based on the Guidelines recommendations, resulted in improvement of the outcome of patients with severe head injury.

4.7.3. Problems encountered

In the year 2003 we had a minor problem when entering the data into the database due to the lack of first edition of database's software. This problem was solved soon after and the problem disappeared.

There is a permanent minor problem related to the quality of ambulance data but we hope with more education the problem can also be solved.

4.7.4. Technology implementation plan

According to the Guidelines for the management of severe head injury, we have implemented a state-of-the-art treatment for patients with severe head injury as a daily routine. With a good cooperation between the neurosurgeons and the anesthesiologists at our Department, the implementation of novel's treatment of severe head injury was very successful. Our Intensive care unit has had PC IGEH traumatic database software installed from the beginning of July 2003 which made our communication with the IGEH headquarter in Vienna easier and faster. At the moment there is one article about the projects activities waiting to be published in a local magazine of public health environment.

4.7.5. Publications and papers

In the year 2003 we didn't publish any new paper regarding this project. There is one written papers that is going to be pressed in a national surgical publication in the year 2004 with the topics on severe brain injury and database from this conjoined project.

In the past years we published several papers on this topic:

1. Negovetić L., Vukić M., Gopčević A.: Suvremeni principi u liječenju teške ozljede mozga. Liječ Vjesn 121:301-304;1999
2. Vukić M., Negovetić L., Kovač D., Ghajar JB., Gopčević A.: Treatment of patients with severe head injury according to the Guidelines for the management of severe head injury. 2nd Congress of the Croatian Neurosurgical Society, October 1999, Opatija, Croatia, Abstract book, p.100
3. Vukić M., Negovetić L., Kovač D., Ghajar JB., Glavić Ž., Gopčević A.: The effect of implementation of guidelines for the management of severe head injury on patient treatment and outcome. Acta Neurochir 141:1203-1208;1999
4. Ghajar JB: Effect of implementation of severe head injury guidelines-The Central & Eastern Europe experience. Special lecture,69th Annual Meeting AANS,Toronto 2001

We should also point out that Croatian Ministry of Science and Technology found this topic very interesting that resulted in granting some funds to develop a nationally oriented project concerning the treatment severe head injury.

4.7.6. Conclusion

So far this project has met our expectations regarding the benefit of the treatment of severe head injured patients according to the Guidelines for the management of severe head injury. At the end of the project it will be interesting to see the difference in the patients outcome between the three Balkan countries involved in the project and compare all results achieved in this project with EU countries. We hope that this project at his end, will determine the main problems faced when treating severe head injury and will offer variety of evidence based medicine solutions in overcoming encountered problems.

Miroslav Vukic, MD, PhD
National Project Coordinator

4.8. Participant 9 - BH Sarajevo

Annexes

4.9. Meetings reports

4.9.1. Minutes from the 1st Workshop

Introduction

Workshop meetings were held over two days from the 19th to the 20th of January 2003 at the hotel ARCOTEN Wimberger, Vienna to obtain information on the current situation in the CEEC centers of participants, to discuss the communication policy of the project and to demonstrate the software for the TBI-Trac™ system. All issues raised related to project implementation were addressed accordingly.

Day 1

Date: 19/01/03 **Time:** 9:00 – 17:00 **Venue:** Hotel ARCOTEL Wimberger, Vienna

Present:

Participant 1: IGEH: Rusnák, Martin Univ.Do., Dr.Med., Ph.D – *Project Coordinator*, Janciak, Ivan – *Information Technology*, Cantin, Heather – *Research Assistant*

Participant 2: AU Vienna Epidemiology: Piribauer, Franz MD, MPH

Participant 3: CZ Brno: Wendsche, Peter prof. MD. Ph.D.

Participant 4: SK Nove Zamky: Urbansky, Milan MD

Participant 5: FYROM Skopje: Soljakova, Marija prof. MD. Ph.D., Todorova-Nikolova, Zorka prof. MD. Ph.D.

Participant 6: HR Osijek: Splavski, Bruno prof. MD, MSc, Saftic, Robert MD, Takac, Ines MD

Participant 8: HR Zagreb: Vukic, Miroslav MD, MSc, Ph.D., Jednacak, Hrvoje MD

Participant 9: BH Sarajevo: Dizdarevic, Kemal MD, Omerhodzic, Merim MD

Representatives from Participant 7: HR Rijeka were unable to be in attendance.

Day 2

Date: 20/01/03 **Time:** 9:00 – 14:00 **Venue:** Hotel ARCOTEL Wimberger, Vienna

Present:

Participant 1: IGEH: Rusnák, Martin Univ.Do., Dr.Med., Ph.D – *Project Coordinator*, Mauritz, Walter Univ.Prof. MD; PhD – *Expert*, Janciak, Ivan – *Information Technology*, Cantin, Heather – *Research Assistant*

Participant 2: AU Vienna Epidemiology: Piribauer, Franz MD, MPH

Participant 3: CZ Brno: Wendsche, Peter MD

Participant 4: SK Nove Zamky: Urbansky, Milan MD

Participant 5: FYROM Skopje: Soljakova, Marija MD, Todorova-Nikolova, Zorka MD

Participant 6: HR Osijek: Splavski, Bruno MD, MSc, Saftic, Robert MD, Takac, Ines MD

Participant 8: HR Zagreb: Vukic, Miroslav MD, MSc, Jednacak, Hrvoje MD,

Participant 9: BH Sarajevo: Dizdarevic, Kemal MD, Omerhodzic, Merim MD

Representatives from Participant 7: HR Rijeka were unable to be in attendance.

Agenda

Jan. 19th Sunday

9:00	Introduction of the project participants	
	Introduction to IGEH and it's activities	Martin
	Project description, outline of activities	Martin
<i>buffet lunch</i>		
	Situation in centers, questionnaire, discussion	Martin
	Introduction to ITCP database and hands on training	Ivan
<i>Dinner – typical Vienna restaurant</i>		
Jan. 20th Monday		
9:00	ITCP database hands on training	Ivan
	Introduction to TBI Guidelines	Walter
	Other opportunities for cooperation	Martin
	Next steps and discussion	
14:00	Visit to Lorenz Bohler Trauma Hospital - optional	Walter

All the items in the agenda were exhaustively addressed.

Presentations

All presentations are to be found at the project's web site

http://www.igeh.org/project4_1_1.php.

Situation analysis in centres

Discussion on the situation in centres revealed, that there is a need for computers to use ITCP database effectively. All the centres have opportunity to connect to the internet.

Updated information on contacts:

Participant 1: IGEH, Internationale Gesellschaft zur Erforschung von Hirntraumata, Univ. Doz. Dr. Med. Martin Rusnák, PhD Executive Director, Mülkergasse 4/3, A-1080 Wien, Austria, t: +43 1 409 0363, f: +43 1 409 0363, m: +43 699 10720 609, mrusnak@igeh.org, <http://www.igeh.org/>

Participant 2: CZ Brno Úrazová nemocnice Brno, Spinální jednotka, Doc. MUDr. Petr Wendsche, CSc, Ponávka 6, 662 50 Brno, Czech Republic, t:+420 5 455 38 394, f:+420 5 455 38 276, p.wendsche@unbr.cz, www.unbr.cz

Participant 3: SK Nove Zamky, Obcianske zdruzenie pre urazy hlavy, NsP Nové Zámky, Dr. Milan Urbanský, Slovenská 11, Nové Zámky, Slovenská rep., t:+421 35 691 2 419, f:+421 35 6401 063, milanurba@hotmail.com, m:+421 905 849 514

Participant 4: AU Vienna Epidemiology, The Center for Applied Epidemiology and Health Policy, Dr. Franz Piribauer, MPH, Consultant für Qualität und Evidenz im Gesundheitswesen, PiCo, Wimberggasse 14-16/2-21, Wien, A-1070, Österreich, t: +431 526 7750f: +43 1 524 6020, m: +43 650 524 6020, PiCo@EUnet.at, [http:// www.pico.at](http://www.pico.at)

Participant 5 FYROM Skopje, Clinical Center at Medical Faculty-Skopje, Clinic of Anesth., Reanimation and Intensive Care Medicine, Prof. Marija Soljakova, ul. Vondjanska 17, 1000 Skopje, Makedonija, t:+389 2 147 039; f:+389 2 111 770; m:+398 702 28530, soljakm@ukim.edu.mk

Participant 6: HR Osijek, Osijek University Hospital, Division of Neurosurgery University Hospital Osijek, Dr. Bruno Splavski, Head, Josipa Huttlera 4, 31 000 Osijek, Croatia, t:+385 31 511 383, f:+385 31 512 222, splavski.bruno@kbo.hr

Participant 7: HR Rijeka, University Clinical Center in Rijeka, Dr. Dean Giroto, M.Sc., Neurosurgeon, Tome Strizica 3, HS-1000 Rijeka, Croatia, t: +385 51 217 753, f: +385 51 217 713, m: +385 91 201 1863, dean.giroto@ri.hinet.hr

Participant 8: HR Zagreb, Medical School, University Clinical Center Zagreb, Department of Neurosurgery, Dr. Miroslav Vukic, PhD, Kispaticeva 12, 10000 Zagreb, Croatia, t:+385 1 2388524, f:+385 1 2363531, crsm@iskon.hr

Participant 9: **BH Sarajevo**, Clinical centre University of Sarajevo, Department of Neurosurgery, Dr. Kemal Dizdarevic, Bolnicka 25, 71000 Sarajevo, Bosnia & Herzegovina, t:+ 387 33 666620 ext. 3106; 2222, f:+387 (33) 208672, kemaldiz@bih.net.ba, www.kcus.net Clinical Centre, University of Sarajevo

Characteristics of the Centres

Questionnaire was used to collect information on centres collecting data using ITCP database. The questionnaire was projected and interactively filled in for each of the centres. Thus all issues of interest were made known to all participants as well as discussed. The questionnaire administered during the meeting yielded more insight into the characteristics of participating centres. Those will be used to identify needs as well as to standardize results from statistical analysis. The characteristics were

Hospital Catchments Area

Table 1 Administrative area served

Administrative	Number of hospitals
National	2
Regional	3
Local	0
not defined	0
Total	5

Ambulance Services

Table 2 Amount of people served by hospitals

Population	Number of hospitals
<100.000	0
100.000-500.000	2
500.000-1 milion	1
more then 1 milion	1
not defined	0
Total	4

Ambulance services	Number of hospitals
in house	0
prov by municipality	4
regional authorities	4
private organizations	0
Total	8

Table 3 Providers of prehospital services

Ground trans procedures	Number of hospitals
RSI	2
Ventilation	2
Monitoring BP	4
Oximetry	2
Kapnography	0
Total	10

Table 4 Equipment in ambulance cars

Staff at Ground Transportation	Always
Physicians	4
Nurses	3
Paramedics	0
Volunteers	0
Total	7

Table 5 Professional level of staff serving in ambulance cars

Characteristics of the Trauma Center

TC level	# of hospitals
local	0
regional	3
national	1
university	4
tc local	0
tc regional	2
tc national	1
Total	11

Table 6 Level of the trauma center (TC)

Hospital name	Total beds	Trauma			ICU Nurses
		ICU Beds	Physicians	Employees	
Zagreb	2500	10	500	4500	15
Skopje	500	16	0	0	47
Sarajevo	2000	15	0	0	0
Osijek	2000	8	300	2500	25
Total	7000	49	800	7000	87

Table 7 Comparisons of structural resources in centres

Centre	CT/24 hours	# ventilators	# bed side monitors
	Zagreb	Y	10
Skopje	Y	15	20

Sarajevo	Y	0	0
Osijek	Y	8	12
Total	4	33	42

Table 8 Equipment available at ICUs

Workload

Centre	patients admitted to ICU	# patients with GCS<9
Zagreb	Y	4
Skopje	Y	7
Sarajevo	Y	7
Osijek	Y	3
Total	4	21

Table 9 Admission of TBI patients to ICU and numbers of severe TBI patients per month

ITCP Database Introduction and Training

Mr. Janciak introduced the database ITCP to be used for the entire project. This represents a change to the plan, since during the project's planning period, it was expected that the TBI-trac™ will be used. Since that time IGEH developed new one, more suitable for outcome and quality of care research. It also allows for patients follow up. He indicated that the database is living product and it is developing over time. IGEH will send all the centres new versions immediately. No data will be lost with new version update. Participants were reminded, that frequent synchronization of database data with the server will secure the data against potential lost.

Discussion to the Project

Participants discussed the project in details and all items were elucidated in details. No open items were left. All participants agreed upon the plan of the project, time lines and procedures of reimbursement. The procedure agreed on was based on **Time Sheets**, which will be used to report time spent at the project. All participants received an example of the formulary to be used.

Alterations to the proposed schedule

Work plan

No alterations to the proposed plan of research were suggested

Resource Schedule

There were no changes to the resources schedule as it applies to the entire duration of the project.

Visit to the Lorenz Bohler Trauma Hospital

Most of participants joined prof. Dr. Walter Mauritz for the visit to the Trauma Hospital. The hospital represents an example of trauma centres, which has been followed in number of similar ones (Budapest, Brno). Participants had an opportunity to see all the procedure line from transportation, through early resuscitation to intensive treatment units. The visit provided an example of high quality trauma facility of European style.

Conclusions and Recommendations

Overall conclusions on implementation to date

All the project participants were convinced, that there are no serious restrictions seen right now to limit activities and to reach foreseen results.

Next meeting

Next meeting of the whole group will be in December 2003 according to the plan. The TBI Guidelines will be primary focus of the meeting along with an overview of collected data. The meeting place will be announced later.

4.9.2. Minutes Workshop 2

Date: Saturday, November 22, 2003

Time: 9am – 6pm

Venue: Bratislava, Slovakia

Present: see the list of participants attached

The workshop was held with several **objectives**:

To review current state of the project and to evaluate results reached in the 1st year;

To initiate quality control of data collected;

To introduce and discuss individual procedures of TBI treatment based on TBI Guidelines.

List of Documents each participant received:

Agenda

Address list

TBI Guidelines

Guidelines and Management of the patient with traumatic brain injury: State of the Art – Walter Mauritz

Data Description

Presentations:

Trauma Systems – Lucia Lenartova

Epidemiology of TBI – Alexandra Brazinova

Intracranial Hypertension – Petra Dado

International Neurotrauma Research Organization Scale (INROS) – Johannes Leitgeb

Nursing aspects of TBI care – Ingrid Wilbacher

Short history of Bratislava

Details of discussions to individual topics:

Welcoming remarks and introductions – M. Rusnak

Dr. Rusnak asked all the participants to introduce themselves. Participants were asked to update their contact information, too.

Overview of the project – M. Rusnak and reports from centers with a discussion

Dr. Rusnak gave a presentation on the project between the kick off meeting and today. He also outlined major challenges for the coming second year of the project. The

discussion was mostly concerned with issues of data collection, quality of data and problems of patient selection.

Guidelines and Management of the patient with traumatic brain injury: State of the Art – Walter Mauritz

The presentation of guidelines and clinical protocols was followed by an extensive discussion.

Discussion

Q: Who monitors SjO₂ routinely. A: M.Vukic : 80% of our patients have jugular bulb monitoring, average of SjO₂ in our patients is 50, we take samples every 12 hours.

Q: Does anyone use PA catheters? A: No.

Q: Does anyone use hypothermia? Prof. Soljakova: Sometimes.

Q: Does anyone use minimal nursing? No.

Q: Tris buffer – is expensive for us (M.Skoljakova)

Q: Do you do decompressive craniotomy? A: M.Soljakova – sometimes. M.Vukic – it's a problem. Indications: blood mass, GCS < 5, diffusive edema, age < 40, ICP > 30, under barbiturates and cooling.

Q: What forms of antithrombotic treatment do you use. A: M.Soljakova – we use in early stage (2nd day) low dose heparin, from the first moment ranitidine, proton pump.

Q: antibiotics shouldn't be used as prophylaxis. A: B.Splavski: we don't use it in traumatic patients, only if there is subarachnoidal hemorage.

Q: what is the best time to operate on other than head trauma in multiple trauma patients?

A: M.Soljakova: we do it after 24 hours. W.Mauritz: we try to do all operations in one session. There are no good comparative data for this.

Other comments and suggestions: Check the pathways in your handouts and send us all ideas by email; M.Rusnak: we will put all information on our website; W.Mauritz: insert your own clinical pathways and mail them back to us. Final product of this project will be a book on TBI treatment written by this group.

Presentation of data from centers – M.Rusnak and I.Janciak

The data were sorted and displayed to start a discussion on their quality. (See below)

M.Vukic commented that his center has at least 30% of isolated trauma. Q: W.Mauritz:

does anybody use algorithm for estimating alcohol by osmolality? A: No.

Participants felt that there is a need for detailed quality of data verification process. Mr. Janciak will prepare an algorithm to check missing and erroneous data and will send the results to all centers.

Suggestions of particular research items by members IGEH team

Trauma Systems – Lucia Lenartova

Prof. Wendsche suggested to submit this paper for the conference on trauma care to be held in Prague next year.

Epidemiology of TBI – Alexandra Brazinova

The data from ITCP already allow for epidemiologic exploration of the situation in different places. The data will be correlated with externalities to explore effects of external factors and to delineate policy options for a change.

Intracranial Hypertension – Petra Dado

The discussion confirmed that causes of intracranial hypertension are probably the major killer in this instant. However there is still no uniformity in preventing processes leading

to intracranial hypertension. Those processes should be mapped and more research is needed to reveal validity of different treatment and management options.

International Neurotrauma Research Organization Scale (INROS) – Johannes Leitgeb
Classification of CT scans is done qualitatively only. There is a need to introduce a scale to be able to link the CT image with outcome. Such a scale was developed by IGEH and is offered to participants. Further research is needed to quantify the impact of the scale on outcome. The discussion revealed different opinions on the scale.

Nursing aspects of TBI care – Ingrid Wilbacher

It was generally understood, that nursing and its impact on patient's outcome is not sufficiently recognized and understood. However, there is no doubt about importance of this issue. Participants decided to look closer into those items.

Discussion on next steps

The discussion was positive about results reached so far. There is more effort to be allocated to improve completeness of data collected. All items were fully covered for all participants.

Next meeting was decided to have in Rijeka at the end of May. Participants were invited to submit papers to the Prague symposium. In the final debate on long term outlooks prof. W.Mauritz: a paper should be written on the course of ICP in TBI patients and also to start developing a monograph.

List of participants

MUDr. Miriam Bartošová, Anesteziolog Dpt. Anesthesiology and Intensive Care NsP Michalovce 071 01 Michalovce Slovakia bartosova@hotmail.com

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Dr Dean Giroto, M.Sc. Neurosurgeon Dpt. Neurosurgery University Hospital Rijeka Tome Strizica 3 HS-1000 Rijeka Croatia dean.giroto@ri.hinet.hr

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Dr. Bruno Splavski, Ph.D. Head Dpt. Neurosurgery Hospital Osijek Josipa Hutlera 4 31 000 Osijek Croatia splavski.bruno@kbo.hr

Dr. Ivica Stefanovski Clinic of Anesth., Reanimation and Intensive Care Medicine Clinical Center at Medical Faculty ul. Vondjanska 17 1000 Skopje Macedonia

Dr. Duje Vukas, Dpt. Neurosurgery University Hospital Rijeka Tome Strizica 3 HS-1000 Rijeka Croatia

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Univ.Prof.Dr.Med. Petr Wendsche, CSc Spinální jednotka Úrazová nemocnice Brno Ponávka 6 662 50 Brno Ceska Republika p.wendsche@unbr.cz

Mrs. Ingrid Wilbacher, RN, IGEH, Mülkergasse 4/4, A-1080 Wien, Austria, iwilbacher@igeh.org

Visit to hospital

In the end of the meeting a visit to Bratislava Municipal Hospital was arranged. Participants visited Intensive Care Unit and discussed the situation in TBI management with local staff.

4.9.3. Minutes Meeting Participant 8 – HR Zagreb

Date: Wednesday, February 26th, 2003

Time: 8am – 3pm

Venue: Rebro Hospital, Zagreb Croatia – Department of Neurosurgery

Present: Dr. Martin Rusnak, MD, PhD

DI Ivan Janciak

Miss Heather Cantin

Dr. Miroslav Vukic, MD, PhD

Dr. Hrvoje Jednacak

Prof. Dr. J. Paladino, Chief of Department, Hospital director
Neurosurgical staff of Rebro Hospital, Zagreb

8:30 – 9:00

A presentation was given by Dr. Rusnak to the Neurosurgical staff of the Rebro Hospital in order to introduce them to Participant 1 – IGEH and the project. A general overview was given and all questions pertaining to the project were fielded.

9:15 – 9:45

A brief tour was given to the representatives of Participant 1: IGEH of the Neurosurgical department of Rebro Hospital.

10:00 – 11:00

A meeting was held between Dr's Rusnak, prof. J.Paladino, Dr. M. Vukic, and Dr. H. Jednacak to discuss the project in greater detail as it pertains to the Neurosurgical department of Rebro Hospital. Opportunities for future cooperation were also addressed.

11:30 – 13:00

Dr. Rusnak, Dr. Vukic, and Mr. Janciak identified the necessary computer for the Neurosurgical department to implement this project and made all arrangements for the purchase and installation of said computer.

At the same time, Ms. Cantin – Research Assistant was invited to observe a procedure in the O.R. The procedure involved the removal of a benign tumor and a series of cysts from the brain of a 24 year old female.

The visit to Participant 8: HR Zagreb was adjourned to the satisfaction of all parties.

4.9.4. Meeting Participant 7 - HR Rijeka

Date: Wednesday February 27th, 2003,

Time: 9am – 3pm

Venue: Clinical Hospital Rijeka, Rijeka Croatia – Department of Neurosurgery

Present: Dr. Martin Rusnak, MD, PhD, DI Ivan Janciak, Miss Heather Cantin, Dr. Dean Giroto, Dr. Neven Eskinja

8:00 – 10:00

Meeting with Dr. Giroto and Dr. Neven Eskinja

- protocol for TBI of Rijeka was explained/demonstrated to Dr. Rusnak
- All doctors in ICU must use it and fill out a sheet to be controlled by Dr. Giroto or his Chief that they have used this protocol in treatment
- Dr. Rusnak: What we need to do today:
 - o Go through the database
 - o Discuss logistic and financial aspects of the project
 - o Give general overview of the project

10:00 – 11:00

Provision of a computer. Good quality computer was purchased and conditions for delivery and installation were confirmed.

12:00 – 15:00

ITCP database was installed in department's computer and Dr. Giroto was instructed to use the ITCP database. One patient was fully entered and discussed. The center is ready to start entering patients.

19:00 – 21:00

Dinner with Dr. Eskinja – issues of the project implementation and problems of Traumatic Brain Injuries in the region were discussed in details.

The visit to Participant 7: HR Rijeka was adjourned to the satisfaction of all parties.

4.9.5. Meeting Participant 5 – FYROM Skoplje

Date: 23/03/2003

Time: 9am – 3pm

Venue: KARIL, Vodnjanska 17, Skopje, 1000-MKD, Macedonia

Present: Dr. Martin Rusnak, prof. Dr.Med. Maria Soljakova and prof. Dr.Med. Zorka Todorova Nikolova

- 1) **Invited lecture:** Rusnak,M., Mauritz,W., Urbansky,M.: Evidence based medicine in brain trauma care.
- 2) **Meeting** with prof. Dr.Med. Maria Soljakova and prof. Dr.Med. Zorka Todorova Nikolova, Dpt. of Anesthesia and Intensive Care, KARIL, Skoplje:
 - a) **ITCP database and data collection** – 21 cases entered, very good quality of inputs, high mortality rate. Data saved on a diskette; new version demonstrated.
 - b) **Computer** – there is an urgent need for the computer, the current one is old and slow. Two offers reviewed and one was selected to purchase with some changes in configuration incurred.
 - c) **Data analysis** was requested, prof. Soljakova will send Ivan Janciak a list of variables they want to analyze.
 - d) **Time sheets** were reviewed and explained the procedure.
 - e) **Meeting of the group** in November in Skoplje. Prof. Soljakova will check the accommodation (between 60 to 80 EUR/night/person); the meeting room probably at the hospital, conditions for receiving of visas and other related issues.

Web site more inputs were offered for presenting Skoplje group at the web site of the project.

The visit to Participant 5: FYROM Skoplje was adjourned to the satisfaction of all parties.

4.9.6. Meeting Participant 6 – HR Osijek

Date: May 21st, 2003

Time: 8 - 10pm

Venue: Osijek

Present: Dr. Martin Rusnak
Dr. Bruno Splavski
Dr. Dario Muzevic

During the meeting issues of the project implementation were discussed. Dr. Muzevic is responsible for data entry. Osijek region faces many TBI cases monthly. Problems with transportation to the hospital persists.

Date: May 22nd, 2003

Time: 8:30am – 1:00pm

Venue: Osijek
Present: Dr. Martin Rusnak
Dr. Bruno Splavski
Staff of the Department of Neurosurgery

8:30 – 9:00

A presentation was given by Dr. Rusnak to the Neurosurgical staff of the Osijek Hospital in order to introduce them to **Participant 1 – IGEH** and the project. A general overview was given and all questions pertaining to the project were fielded.

9:15 – 9:45

A brief tour was given to the representatives of **Participant 1: IGEH** of the Neurosurgical department of Osijek Hospital.

10:00 – 11:00

Dr. Muzevic was instructed to use the ITCP database. One patient was fully entered and discussed. The center is ready to start entering patients.

11:00 – 12:00

A meeting was held between Dr's Rusnak, dr. Splavski to discuss the project in greater detail as it pertains to the Neurosurgical department of Osijek Hospital. Opportunities for future cooperation were also addressed.

11:30 – 13:00

Dr. Rusnak, Dr. Splavski and Dr. Muzevic identified the necessary computer for the Neurosurgical department to implement this project and made all arrangements for the purchase and installation of said computer.

The visit to Participant 6: HR - Osijek was adjourned to the satisfaction of all parties.

4.9.7. Meeting participant 9 – BH Sarajevo

Visit: **Participant 9 – BH Sarajevo**

Date: **Tuesday, June 17th, 2003,**

Time: 3 pm – 5 pm

Venue: Digital Net Computers

Present: Dr. Kemal Dizdarevic
Dr. Merim Ohmerhodzic
Dr. Martin Rusnak
Representative DNC comp.

From 2 different offers the one from DNC Company was selected because of the quality of the offer and services offered. Also the value for the price was beneficial. The computer was purchased and will be delivered to the hospital in two days. 1 year full guarantee contract was signed.

Afterwards a meeting with Dr. Dizdarevic went on discussing general issues related to the brain trauma policies and education in EBM in Bosnia and Herzegovina.

Date: **Wednesday June 18h, 2003,**

Time: 10am - 3 pm

Venue: Clinical Center, Dpt. of Neurosurgery, Sarajevo

Present: Dr. Kemal Dizdarevic
Dr. Merim Ohmerhodzic
Dr. Martin Rusnak
Jasmina Brahmi

• ITCP related issues

- Total number of cases recorded 46;
- Miss. Jasmina Brahmi, the ICU nurse is responsible for collecting retrospective data; she reported a problem: when the birth date is entered then other dates will be modified erroneously;
- In many cases it is hard if not impossible to reconstruct the history of transportation of patients, especially if a patient was transported from a place outside of Sarajevo;
- They do not measure the mass of a lesion in CT;
- TRISS: when the TRISS is finished the value of the first SBP disappears;
- Blood alcohol measurements are not provided routinely, they do not use the osmolality formulas for approximation (send the one); help on FiO₂ and PaO₂ should be added;
- Ranking of disabilities should be added to help;
- Synchronization with the central db is not available, because they do not have an access to Internet, but with a new computer they will receive a direct internet connection; the data were stored on a diskette and transported to Wien;
- Long term follow up is successful in about 60% of cases;

• Data analysis

- There are possibilities to analyze collected data before the overall analysis is performed:
 - The whole data set for Sarajevo will be transcript to Excel spreadsheet format;

- Subset of data (based on a request from Sarajevo team) will be defined and transcript to Excel spreadsheet format;
- After the hypothesis are defined and formulated the analysis will be performed by IGEH staff;
- **Web site:** The department has very nice website, the link will be added to the project's one: www.healthbosnia.com or www.zdravstvo.com ;
- **Time sheets** received, they should be signed by the head of the program in Sarajevo – Dr. Dizdarevic for all participants;
- **Next workshop**– two persons from Sarajevo will join the meeting;
- **Other issues**
 - The ICU wants to develop new charts from patients, they would appreciate an example from Lorenz Bohler Unfall Krankenhaus;
 - There will be a workshop in Sarajevo and Dr. Dizdarevic asked for a presentation on Evidence Based Medicine and TBI
 - Visits to LB Krankenhause are feasible, but those interested will have to inquire in the Austrian Embassy concerning a grant covering expenses.

The visit to Participant 9: BH Sarajevo was adjourned to the satisfaction of all parties. All participants agreed that another visit is important to arrange this year to facilitate the data entry.

4.9.8. 2nd Meeting Participant 9 – BH Sarajevo

Visit: **Participant 9 – BH Sarajevo**

Date: **September 20, 2003,**

Time: 9 am – 5 pm

Venue: Clinical Centre University of Sarajevo

Present: Participants of the **First B&H Meeting on Neurotrauma with International Participation**

PROGRAM :

Doc. Dr. Gavrankapetanovic, General Director of the Clinical Centre University of Sarajevo (CCUS); Prim. Dr. Kadic, Chairman of the Department of Neurosurgery, CCUS.

1. Evidence based medicine and neurotrauma (Medicina bazirna na činjenicama i neurotrauma)

Doc.Dr. Martin Rusnák

2. B&H and The International project of neurotrauma (BiH i internacionalni projekt za neurotraumu)

Mr. Dr Kemal Dizdarevic, project representative on behalf of Bosnia&Herzegovina

3. Fracture management of the thoracic and lumbar spine. (Menadžment fraktura torakalne i lumbalne kičme) Dr. Stefan Hauck;

4. Pathological fracture management by vertebroplasty and kyphoplasty. (Menadžment patoloških fraktura vertebroplastikom i kifoplastikom)

Dr.Bronek Boszczyk, najveća serija kifoplastika u Evropi;

5. Cervical fracture management (Menadžment cervikalnih fraktura) Dr.Bronek Boszczyk

Date: **September 20, 2003,**

Time: 9 am – 5 pm

Venue: Clinical Centre University of Sarajevo

Present: Dr. Kemal Dizdarevic

Dr. Merim Ohmerhodzic

Dr. Martin Rusnak

During the meeting issues of transportation to the hospital and the notes taken by ambulance staff were discussed. Also an issue of alcohol estimation from osmolality was suggested to follow. Follow up of cases was found problematic in instances, when a patient is moved to another region. In general, the data collection works fine and the center has already almost 100 cases recorded in very good quality.

The visit to Participant 9: BH Sarajevo was adjourned to the satisfaction of all parties

5. Completed catalogue page

(summary of the project, as at the beginning, + one section called “Resultes achieved”, max 10 lines)

Data sheet for final report

Contract number : ICA2-CT-

Year : 2002

Data sheet for final report

(to be completed by the co-ordinator for the whole project)

1. Dissemination activities

	<u>Published</u>	<u>Submitted</u>
Number of communications in conferences	<input type="text"/>	<input type="text"/>
Number of communications in other media (internet, video, ...)	<input type="text"/>	<input type="text"/>
Number of publications in refereed journals	<input type="text"/>	<input type="text"/>
Number of articles/books	<input type="text"/>	<input type="text"/>
Number of other publications	<input type="text"/>	<input type="text"/>

2. Training

Number of PhDs	<input type="text"/>
Number of MScs	<input type="text"/>
Number of visiting scientists	<input type="text"/>
Number of exchanges of scientists (stay longer than 3 months)	<input type="text"/>

3. Achieved results

Number of patent applications	<input type="text"/>
Number of patents granted	<input type="text"/>
Number of companies created	<input type="text"/>
Number of new prototypes/products developed	<input type="text"/>
Number of new tests/methods developed	<input type="text"/>
Number of new norms/standards developed	<input type="text"/>
Number of new softwares/codes developed	<input type="text"/>
Number of production processes	<input type="text"/>
Number of new services	<input type="text"/>
Number of licenses issued	<input type="text"/>

4. Industrial aspects

Industrial contacts

yes no

Financial contribution by industry

yes no

Industrial partners : - Large

yes no

- SME¹

yes no

5. Comments

Other achievements (use separate page if necessary)

¹ Less than 500 employees.
