

Report on the Seventh Tbilisi Symposium

Hemorheology in microcirculation: pathological changes – Internet/E-mail discussion proceeding from October 1998 to June 1999

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Specificity

A special feature of the Tbilisi symposia, held since 1963, has been a permanent search for the optimal mode of carrying out both biomedical problem analysis and discussions by highly experienced scientists with a view to determining the current state of the problem solution. To this end we: (1) formulated preliminarily all the particular points to be discussed, (2) found optimal ways of carrying out discussions, and (3) summarized and published various views of, and conclusions made by, the symposium's participants during the sessions.

Subject

Rheological properties of blood, which are manifested primarily and mostly in the microcirculation, play an essential role both in normal blood supply to all living tissues and development of various pathologies. Although there were many remarkable publications regarding this problem, the theoretical basis and practical consequences of the hemorheological phenomena in microvessels are in need of further insight. The problem is complex since the availability of the red and white cells, whose size is comparable to the microvessel lumina, makes it impossible to deem the blood as a real fluid there. Therefore, the flow of blood in microvessels does not obey the rules of classical fluid mechanics. The blood rheological properties in the microcirculation are even more distinctive since neither muscle cells nor pronounced vasomotor activity are specific to the capillaries. It is just the microvessels that are mostly affected by hemorheological disorders, since proceeding from Poiseuille's law the flow resistance increases in the fourth power with narrowing of the vascular lumina and is therefore particularly high in the narrowest microvessels.

Scope

The recently completed 7th Tbilisi Symposium had several features that distinguished it from the traditional scientific meetings. First, it was a multidisciplinary scientific conference of specialists representing three biomedical disciplines – microcirculation, clinical hemorheology, and biorheology. The participants discussed jointly problems of the blood rheological disorders in microvessels, which are responsible for development of such widespread diseases, as arterial hypertension, brain and myocardial infarctions, various types of inflammation, complications (gangrenes) of diabetes mellitus, aging disorders, and many others. Another distinctive feature of this nontraditional “meeting” was that it represented an Internet/E-mail symposium that allowed the specialists to carry out discussions without leaving their workplaces. Staying at home, they used modern telecommunication possibilities for regular interchange of their opinions with colleagues from various countries and continents. One more feature of this symposium was that the specialists carried out discussions without the restrictions of conventional scientific meetings – they had sufficient time for careful consideration of each point and of all the aspects of the problems under discussion.

Approach

Interestingly, there were no presentations of scientific papers in the usual sense and there were only discussions at the sessions that helped to make the symposium discussions maximally efficient. The “structured discussions” have been carried out at the Tbilisi symposia since the end of 1970s. Such a purposeful interchange of ideas was achieved due to a preliminary system analysis of the problems to be discussed. The analysis proceeded in two stages: it included, first, specification of each subproblem (constituent parts of the problem) to be discussed and then, the specific points to be considered during the discussion. The subproblems were in a sense independent, but each of them was to be resolved in order to attain the ultimate solution of the whole Symposium’s problem. The subproblems of the present Tbilisi symposium were as follows:

- A. Specificities of blood flow and hemorheological disorders in the microcirculation;
- B. Most significant hemorheological parameters disturbing blood flow in microvessels;
- C. Specific effects of different hemorheological factors on the blood flow resistance in the living microvessels;
- D. Mechanisms of hemorheological disorders in microvessels.

Mode of carrying out discussions

Modern telecommunication created favorable possibilities to carry out scientific discussions through the use of both the electronic mail and the Internet. The discussions of the present symposium started in October 1998 and were carried out till July 1999. All the participants taking part in the discussions remained at home and used their personal computers to access the Internet where the Tbilisi Symposium’s Web Site with the previous comments was displayed. The participants sent their critical comments, views, questions and replies to the Symposium organizers. These texts were then displayed at the Symposium’s Web Page, so that all the participants, as well as other specialists interested in the problem could follow up the discussions and send their own comments for displaying on the Symposium’s Web Page. Discussions

of each subproblem were displayed during one or two months, so that everybody in the world could be acquainted with them. Afterwards, the discussions were replaced by gradually accumulated comments of the next subproblem, and so on.

Functions of the organizers

In order to carry out such non-traditional scientific discussions the organizers had to perform a number of functions which were as follows. At the organization stage, prior to the discussions and in their course, there was an uninterrupted two-sided transfer of information, as a feedback, between the organizers and discussants. This information, in the form of individual comments, was continuously displayed on the Web Page of the Symposium. Under these conditions all participants and the interested specialists who did not participate in the discussions could be informed in the state and on the course of the Symposium's discussions. In organizing and in carrying out this symposium the Tbilisi team of organizers fulfilled the following functions: (1) They provided worldwide information about organizing the Symposium in announcements published in special journals in the field, and in Newsletters of the Scientific Societies, as well as in personal letters to scientists, including a short description on how the symposium would be carried out, etc. (2) The organizers carried on correspondence through the electronic mail with individual scientists who expressed interest and had agreed to be active participants in the discussions. They received and displayed in the Web Page of the Symposium all the comments, questions, replies, etc. related to the particular points of the symposium problem's system analysis. (3) The organizers performed an appropriate processing of all the information and displayed it in an appropriate order in the Symposium's Web Page of the Internet. This material related to individual subproblems remained in the Internet over the whole period when the discussion of a certain topic was in progress (during one to two months). This was necessary for the discussants and to the specialists interested in the field to keep them informed of the current discussion and to send their comments to the organizers for their inclusion into the actual discussions. (4) After closing of each discussion related to specific subproblems and receiving all materials from the participants, the organizers arranged them in appropriate order to make the discussions readable and interesting for future readers of the book devoted to this symposium. (5) Appropriate editing of all the received materials of the discussions related to individual subproblems and their further analysis for preparation of the manuscript, for their publication as a separate book or as scientific review articles in the special journals devoted to these specific topics.

Opportunities for the participants and organizers

Such symposia are very convenient for the participants since they remained at home and took part in the discussions without interruption of their everyday work. Moreover, participation in such symposia does not require spending money for travel and accommodation abroad. In addition, the participants of the discussions were spared from the possible negative emotional effect of the auditorium, which often interferes with a careful consideration of all the points related to the problem under discussion. Such symposia are also convenient for the organizers, since they cost considerably less than those of conventional meetings. In conclusion, all the novelties introduced into the organization and carrying out of the Seventh Tbilisi Symposium made such discussions highly efficient. Participants of the discussions were acquainted in advance with all the possible points to be discussed. Due to the preliminary systems analysis of the problem meant for consideration, the discussion was more purposeful, the individual

points touched upon by the discussants were not occasional, but devoted to the chosen scientific problem. The scientific level of the discussions was high due to the participation of highly experienced and world-renowned experts in the discussions.

Publication of the symposium's discussions

Upon completion of all the discussions a summarizing session of the present Internet/E-mail Symposium was organized at the International Congress of Biorheology and Clinical Hemorheology held in Pecs, Hungary in July 1999. It is essential that the materials accumulated during the Symposium's discussions be further organized in a coherent fashion. This naturally calls for certain readjustments, including addition and omission of some particular comments. The materials of the present symposium are supposed to be published as a separate book and/or in a special scientific periodical. The final text will represent results of joint and coordinated efforts of all the participants of the symposium, and is meant to give the reader a clear view of the modern level of the problem solution discussed at the symposium. The publication of the symposium's materials will actually reflect the state-of-the-art knowledge of the problem under discussion. In particular, it will provide readers with an overview as to what can be considered as solved, and which points still need to be investigated further by modern biomedical science.