Preface

Perturbation of Hemostatic Function by Nonbiologic Surfaces

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It is expected that regeneration of tissues or organs using stem cells or induced pluripotent stem cells will be one of the mainstays of future medicine. Until this happens, patients with severe organ damage may require artificial devices which might be used as a bridge to organ transplant. With increasing use of implanted medical devices, especially those in contact with circulating blood, many complications have been observed. Many of these are the result of the exposure of blood to a nonbiologic surface, often referred to as biomaterial. There are many complex interactions between the biomaterial and circulating blood that alter different hemostatic functions leading to thrombosis and/or bleeding. As more devices are being developed, these complications are gaining attention, and there are no satisfactory solutions as yet. Thus, we believe that our readers would be interested in several review articles devoted to this topic in this issue of *Seminars in Thrombosis and Hemostasis*.

To begin with, an overview of the complications associated with these devices is provided by one of the guest editors, Dr. Kwaan, with description of the changes following the placement of blood-contacting devices, and how they can perturb various hemostatic functions.[1] Among these functions, those of the platelets play an important role. The interaction between platelets and implanted devices affects hemostasis but can also provoke an inflammatory response. The pathobiology of these processes is therefore presented by Casan et al.[2]

In the subsequent articles, detailed information is provided on the more commonly used devices, especially those used in cardiovascular practice. Problems encountered in cardiac support by extracorporeal membrane oxygenation are discussed by Thomas et al.[3] This is followed by the description of another popular device in pediatric practice, the ventricular assist device, by Adachi et al.[4] Attempts to prevent thrombotic complications after transcatheter heart valves prosthesis placement are then discussed by Sorrentino et al.[5] Improved designs in coronary stents have, in recent years, expanded the lifespan of these devices, as described by Gopalakrishnan and Lofti.[6] Though the problem of catheter-associated thrombosis has not been resolved, an update on their use in critically ill children is discussed by Faustino.[7] Likewise, efforts to reduce complications of hemodialysis and to improve vascular access are presented by Masud et al.[8]

As we look ahead into future developments, an antithrombotic approach for adverse effects of implanted medical devices, using inhibitors against factors XI and XII seems to be promising, as noted by Tillman and Gailani.[9]

Other methods to improve the function of these devices include the enhanced endothelialization of the surface of biomaterials. One such experimental study using titanium-based biomaterial is described by Cui et al.[10]

As we planned this issue and selected these topics, we realized with amazement how enormous the progress has been in the past few years, especially the rapid increase in the use of these implanted devices. We therefore hope our readers will find this topic as exciting as we did.

Conflict of Interest
None.

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