

**SUMMARY MINUTES**  
**of the**  
**GENERAL AND PLASTIC SURGERY**  
**DEVICES PANEL**  
**MEETING**

**November 17, 1998**

**9200 Corporate Blvd.**

**Rockville, Maryland**

**GENERAL AND PLASTIC SURGERY DEVICES PANEL**

**November 17, 1998**

Monica Morrow, M.D.

Chair

Hany Demian

Acting Executive Secretary

Benjamin O. Anderson, M.D.

Joseph V. Boykin, Jr., M.D.

Phyllis Chang, M.D.

Susan Galandiuk, M.D.

Thomas V. Whalen, M.D.

Consumer Representative:

Carolyn Brown Davis

Industry Representative:

James W. Burns, Ph.D.

## **CALL TO ORDER/INTRODUCTORY REMARKS**

Mr. Hany Demian, Acting Executive Secretary, called the General and Plastic Surgery Panel meeting to order at 10:00 a.m. and read the conflict of interest statement into the record. He requested that all persons addressing the Panel disclose any financial interest in the products they were commenting on.

Dr. Morrow noted that the Panel members present constituted a quorum as required by Federal law. At her request, Panel members introduced themselves.

## **UPDATE SINCE THE LAST PANEL MEETING**

Mr. Stephen Rhodes, Chief, Plastic and Reconstructive Surgery Devices Branch, informed the Panel that FDA had approved two PMA products that the Panel deliberated on at the January 1998 meeting, Apligraf by Organogenesis, Inc. on May 22, 1998 and Dermabond by Closure Medical, Inc. on August 26, 1998.

## **YEAR 2000 PROBLEM AND MEDICAL DEVICES**

Mr. Neil Ogden, Reviewer, General Surgery Devices Branch, said that the purpose of his presentation was to increase awareness of the potential impact on medical devices of the year 2000 date problem in computer software. Many medical devices are computer controlled. He requested that Panel members identify devices used in their area of expertise that could present risks to patients due to their use of dates and offer suggestions to CDRH regarding actions to reduce the risks from the year 2000 problem.

Comments or concerns regarding the year 2000 problem and medical devices can be directed to the Executive Secretary or to Mr. Thomas B. Shope, Division of Electronics and Computer Science, Office of Science and Technology, CDRH (phone: 301-443-3314 ext. 32; fax: 301-443-9101; email: tbs@cdrh.fda.gov).

## **INTRODUCTION TO CLASSIFICATION AND RECLASSIFICATION**

### **DELIBERATIONS**

Mr. James Dillard, Deputy Director, Division of General and Restorative Devices, reviewed the statutory and regulatory framework for medical device classification. He said that FDA is required by law to classify all medical devices and to place each device in the least restrictive class that will reasonably assure its safety and effectiveness.

Mr. Dillard explained the difference between a preamendments unclassified device (a device marketed before the Medical Device Amendments went into effect on May 28, 1976, and never presented to a classification panel) and a preamendments class III device (a device marketed before May 28, 1976, that was considered by a classification panel and that FDA classified into class III). Both of these categories of devices currently require 510(k) premarket notification prior to marketing. Wound dressings are examples of preamendments unclassified devices. The topical oxygen chamber for extremities is an example of a preamendments class that was classified into III.

Section 515(i) gives FDA authority to call for more information about a product from manufacturers and other interested parties. This process is used for some preamendments class III devices to determine whether sufficient information exists to justify their reclassification.

Advisory Panel involvement in device classification is required by statute. It is also important because of Panel members' expertise and because of the opportunity presented for public discussion. Mr. Dillard noted that Panel recommendations should be based on valid scientific information about device safety and effectiveness. FDA will then consider the Panel's recommendations in determining the classification of the devices on today's agenda.

## **CLASSIFICATION OF WOUND DRESSINGS**

### **Open Public Hearing**

Ms. Madeline Carroll, Clinical Affairs Manager, Beiersdorf-Jobst, Inc., offered a revised classification system for wound dressings that categorized dressings according to their intended use. She recommended that dressings intended to function as a mechanical barrier and those intended to be placed on or in wounds to manage the wound environment be classified into class I and that dressings used as temporary skin replacements be classified into class II.

### **Health Industry Manufacturers Association Presentation**

Dr. Marlene Tandy, Director of Technology and Regulatory Affairs and Associate General Counsel for the Health Industry Manufacturers Association (HIMA), summarized the HIMA task force classification proposal for wound care products. Assisting her with the presentation were Ms. Anna McRight of 3M Healthcare and Mr. Jim Irvin of Smith & Nephew's Wound Management Division.

Dr. Tandy said that HIMA supports FDA's 1989 classification proposal. She offered identifications for the five wound dressing devices proposed by FDA and examples of devices that HIMA considered appropriate for inclusion in each category, based on intended use and device composition. She noted that the difficulty of devising mutually exclusive categories because some devices fall into more than one category.

Dr. Tandy said that HIMA recommends that all five wound dressings be classified into class I devices because of their low risk and long history of safe and effective clinical use. HIMA further believes that the exemption of these products from premarket requirements would be consistent with the intent of the Food and Drug Administration Modernization Act (FDAMA) of 1997.

Panelist Dr. Anderson asked how it could be known for certain that hydrogel dressings do not have subtle, undetected biological effects. Ms. McRight replied that hydrogel dressings' components had a long history of safety and that biological activity had never been a problem with the device.

### **FDA Presentation**

Ms. Gail Gantt, Reviewer, Plastic and Reconstructive Surgery Devices Branch, reviewed the history of FDA's efforts classify wound dressings. In 1980, several wound-dressing products were classified into class I based on the recommendations of the General Medical Devices Panel. In 1994, several wound-dressing products were exempted from premarket notification requirements. In 1997, FDAMA exempted most class I devices from premarket notification requirements, including all previously classified class I wound dressings.

The five product wound dressing devices presented for the Panel's classification recommendations were as follows:

- nonresorbable gauze/sponge for external use,
- hydrophilic wound dressing,
- occlusive wound dressing,
- hydrogel wound dressing, and
- porcine wound dressing.

Ms. Gantt asked the Panel to consider the potential risks posed by porcine wound dressings (derived from pigskin) and the related FDA guidance document "Medical Devices Containing Material Derived from Animal Sources (Except for In Vitro Diagnostic Devices)", issued earlier this month on November 6, 1998. She noted that pigs are known to contain several viruses that could potentially affect humans and that porcine wound dressings are frequently used in burn patients who may be immunosuppressed.

Ms. Gantt made the following comments in response to questions from Panel members:

- Intended use, device materials, and types of wounds treated were all considered in determining the proposed categorization of wound dressings;
- A wound dressing could fit into multiple classification identifications. A wound dressing that fits into two categories having different device classes would be placed in the higher class;
- A review of 12 years of Medical Device Reports did not identify any significant risk issues or trends relating to any of the wound dressings under consideration;

- Manufacturers of premarket notification class I exempt devices are still required to meet all general controls requirements to reasonably assure their safety and effectiveness; and
- Currently, there is no known evidence of porcine wound dressing-caused infections in humans.

Panel members agreed that they were satisfied that extensive clinical experience with the wound dressing products supports their safety and effectiveness.

### **Open Public Hearing**

Dr. Morrow requested that those who wished to address the Panel during the second Open Public Hearing session come forward. No one present wished to address the Panel.

A recess took place from 11:40 to 11:52 a.m.

### **Panel Discussion (continued)**

Panel members completed a General Device Classification Questionnaire (GDCQ) and Supplemental Data Sheet (SDS) for each of the five wound dressing devices on the agenda. The following points were noted:

- Nonresorbable gauze/sponge for external use has a potential risk of being incorporated into tissue if the dressing is not changed regularly (item 5, SDS);
- Hydrophilic wound dressings should be labeled for external use only (item 4, SDS);
- Occlusive wound dressings are not intended for use with infected wounds (item 5, SDS);
- Use of porcine wound dressings requires written or oral authorization by a licensed practitioner (item 11b, GDCQ); and

- The extent of the risk of viral infection presented by the use of these products is currently uncertain (item 5, SDS). These devices should not be exempt from premarket notification requirements.

### **Panel Vote**

The Panel voted unanimously to recommend that the five wound dressing devices be classified in class I. The Panel also voted to recommend that four of the five wound dressings, the nonresorbable gauze/sponge for external use, the hydrophilic wound dressing, the occlusive wound dressing, and the hydrogel wound dressing, be exempted from premarket notification procedures.

A recess took place from 1:00 to 2:00 p.m.

## **TOPICAL HYPERBARIC OXYGEN CHAMBERS FOR EXTREMITIES**

### **Open Public Hearing**

Dr. Lee Greenbaum, Executive Director, Undersea and Hyperbaric Medical Society, read a letter from Dr. Paul Sheffield, Director of the Jefferson C. Davis Wound Care and Hyperbaric Medicine Center, Methodist Hospital, San Antonio, Texas. In his letter Dr. Sheffield cited three published studies that do not support the hypothesis that topical oxygen improves tissue oxygenation to enhance wound healing.

Mr. Joe Westwood of GWR Medical Systems, a manufacturer of disposable topical oxygen devices, described his company's experience with the use of topical oxygen in wound healing. Within the past two years, he said, the firm has successfully treated more than 100 chronic

nonhealing wounds without any adverse events. Topical oxygen therapy may justifiably be referred to as hyperbaric oxygen therapy, he said, because the pressure involved is greater than 1 atmosphere, which is less than that applied in a full-body hyperbaric oxygen chamber. He stated that there is strong evidence that oxygen applied directly to an open wound at pressure greater than 1 atmosphere increases cellular oxygen levels in surface wound tissue. He concluded by saying that many case studies confirm the effectiveness of topical oxygen as an adjunctive therapy in wound healing and that new controlled trials will be started soon.

Mr. Robert Lasley, retired Chief Executive Officer of Stephenson Industries, a manufacturer of portable topical oxygen chambers, said that the market for topical oxygen products is too small to support randomized double-blind trials. In 20 years of manufacturing its product, he said, his company had accumulated a wealth of anecdotal data demonstrating the therapy's effectiveness without being informed of a single adverse event.

### **Presentation: Clinical Experience with Topical Oxygen**

Dr. Madeline Heng, Professor of Medicine at the University of California at Los Angeles School of Medicine, said that her presentation was based on 25 years' clinical experience with topical oxygen therapy. She described the biochemical processes involved in failure of wounds to heal and her hypothesis that topical oxygen enhances wound healing by stimulating the growth of blood vessels that supply oxygen to the tissues. Her presentation was supplemented by slides illustrating the effect of topical oxygen therapy compared with standard wound treatment of patients

with gangrenous ulcers and burns. Selective growth of new blood vessels facilitates healing without scarring, Dr. Heng said.

In response to questions from Panel members, Dr. Heng made the following comments:

- In a randomized study, standardized dressings were used for comparison with topical oxygen therapy;
- It is her belief that topical oxygen therapy works by destroying free radicals that proliferate in a hypoxic environment, thus enabling new blood vessels to grow; and
- It is her belief that topical oxygen therapy must be administered at a low hyperbaric pressure for effectiveness without any oxygen toxicity.

Panelist Dr. Boykin commented that other studies contradict Dr. Heng's hypothesis that topical oxygen therapy destroys free radicals. These studies also show that many burns heal without scarring in the absence of topical oxygen therapy.

### **Presentation: Studies with Topical Oxygen**

Dr. Roy Myers of the University of Maryland Shock Trauma Unit, Baltimore, Maryland, representing the Undersea and Hyperbaric Medical Society, presented definitions of topical oxygen therapy and hyperbaric oxygen therapy. In the latter, he said, the breathing of oxygen in a pressure-controlled environment leads to the transfer of oxygen through the lungs and into the capillaries, where it is dissolved under pressure in the plasma. He noted that in topical oxygen therapy, defined as the use of oxygen under minimal pressure on an open wound, the plasma is not loaded with oxygen.

Dr. Myers described the results of a randomized, blinded trial that he and his colleagues conducted to compare the outcomes of topical oxygen and topical air (21% oxygen) therapy for treating patients with chronic nonhealing wounds. The number of patients whose wounds healed or improved and the number in whom treatment failed were similar in both groups.

A second study looked at transcutaneous oxygen levels in two groups of human volunteers breathing air or breathing oxygen, with and without a topical oxygen chamber affixed to a limb, and within or outside of a hyperbaric oxygen environment. This study found that whether the pressure modality was air or oxygen, a diminution in the amount of oxygen measured by transcutaneous oxygen monitor occurred when the topical oxygen chamber was in use. The pneumatic effect of topical oxygen appeared to inhibit tissue oxygenation. In a hyperbaric environment, topical oxygen also seemed to inhibit an increase in oxygen levels in tissue.

### **FDA Presentation**

Dr. Charles Durfor, Reviewer, General and Surgical Devices Branch, reviewed the regulatory history of the topical oxygen chamber for treating extremities. The device was marketed prior to the enactment of the Medical Device Amendments in 1976. Although the General and Plastic Surgery Devices Classification Panel recommended in 1982 that the device be classified into class II, FDA classified the device into class III in 1988 because of a lack of valid scientific evidence to support the device's effectiveness. Dr. Durfor noted that FDA has classified the full-body hyperbaric oxygen chamber, a different product than the topical oxygen chamber for treating extremities, into class II.

If the topical oxygen chamber for extremities remains class III device, FDA would be required to call for Premarket Approval (PMA) applications from each manufacturer and, after a transition time, prohibit commercial distribution of any product until a PMA is approved. If the device is reclassified into class II, it could continue to be cleared for marketing through the premarket notification (510(k)) process. Indications for use for recently cleared topical oxygen devices include postsurgical wounds, pressure ulcers, burns, and frostbite.

A review of the scientific literature revealed that few new data had been published since 1988 on the clinical performance of topical oxygen devices. Interpretation of the device's value in wound repair is difficult for several reasons, including the following: All studies were small and unmasked, most studies were uncontrolled, and device use is only one component in the complex process of wound healing. The number of adverse events associated with the device appeared to be very small.

Dr. Durfor concluded by requesting that the Panel, should it recommend reclassification of the device, discuss the special and/or general controls necessary to provide reasonable assurance of the device's safety and effectiveness.

### **Panel Discussion**

Dr. Boykin opened the Panel's deliberations with a brief presentation regarding the evidence for the clinical efficacy of hyperbaric and topical oxygen therapy. He noted that the clinically significant mechanisms of action of hyperbaric oxygen therapy are not achieved with topical oxygen. An evaluation of the effectiveness of topical oxygen would require clearly identified mechanisms of

action; appropriate models; randomized, blinded trials; and statistical data analysis. He suggested that future studies of topical oxygen therapy should examine such factors as time to healing, rates of infection, and production of wound-healing mediators. In addition, adjunctive studies with wound modulators would be helpful.

Dr. Morrow asked each Panel member in turn to state his or her opinion on whether the evidence that had been presented justified reclassification of topical oxygen chambers for extremities from class III to class II. All Panel members stated individually that they had not seen sufficient new evidence of efficacy to justify reclassification at this time.

### **Open Public Hearing**

Mr. Robert Lasley said that the cost of topical oxygen therapy is a fraction of that of hyperbaric oxygen therapy. He reiterated that it would be impractical to conduct the kind of large randomized studies that would provide the evidence of effectiveness that the Panel sought. He concluded by saying that calling for PMAs was likely to lead to the elimination of topical oxygen therapy devices from commercial distribution.

Mr. Joe Westwood said that proponents of topical oxygen therapy do not believe that the treatment increases blood oxygen levels or transcutaneous oxygen levels. It is generally believed to affect surface tissue although the precise mechanism of action is unknown.

Dr. Heng commented that the pressure level is crucial to the therapy's effectiveness; too little pressure will produce no effect, whereas too much will produce oxygen toxicity. She added that any level of pressure greater than 1 atmosphere is considered hyperbaric.

**Panel Discussion (continued)**

The Panel then proceeded to fill out the GDCQ and SDS. Dr. Whalen requested clarification of an apparent inconsistency between Questions 6 and 7 of the GDCQ. Mr. Dillard responded that the wording of Question 6 relates to a little-used statutory provision that permits extremely low-risk products to be classified into class I even though there may be insufficient information to establish special controls to provide reasonable assurance of safety and effectiveness.

In reply to a question from Dr. Chang, Mr. Dillard said that the 1982 panel classification recommendation of class II for the hyperbaric oxygen chamber was because the panel was satisfied that the device's demonstrable benefits outweighed its demonstrable risks and that special controls could be established to provide reasonable assurance of safety and effectiveness. Mr. Dillard stated that although the risks of topical oxygen therapy might be lower than those of hyperbaric oxygen therapy, the Panel must decide whether the benefits of topical oxygen therapy are demonstrable and whether they outweigh the risks.

The Panel members then completed the GDCQ and SDS for the topical oxygen chamber for extremities. The Panel agreed that the device is for a use that is of substantial importance in preventing impairment of human health (item 2, GDCQ). In recommending that FDA place a low priority on requiring the submission of PMAs (item 10, GDCQ), the Panel members stated that they hoped this would facilitate the design of scientifically rigorous studies of the efficacy of topical oxygen chambers for extremities. The following additional points were noted:

- Insufficient information exists to establish special controls to provide reasonable assurance of safety and effectiveness (item 7, GDCQ);
- Use of the device requires authorization by a licensed practitioner (item 11b, GDCQ); and
- A potential risk to circulation in extremities should be noted (item 5, SDS).

### **Panel Vote**

The Panel voted unanimously to recommend that the topical oxygen chamber for extremities remain class III because a lack of data demonstrating efficacy of the device.

### **Tentative Panel Meeting Dates**

The following tentative meeting dates set for 1999 are as follows: March 11 (now cancelled), June 16–18, August 19–20, and November 15–16.

The meeting was adjourned at 4:10 p.m.

I certify that I attended the General and Plastic Surgery Devices Advisory Panel meeting on November 17, 1998, and that this summary accurately reflects what transpired.

  
Hany Demian  
Acting Executive Secretary

I approve the minutes of this meeting as recorded in this summary.

  
Monica Morrow, M.D.  
Chair

Summary Minutes prepared by:  
Eleanor Mayfield  
10227 Green Holly Terrace  
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Summary Minutes revised by  
Janet L. Scudiero, 12/29/98; per C. Durfor, 1/12/99;  
per G. Gant, 1/28/99; per C. Witten, 2/1/99; and  
per S Rhodes, G. Gantt, and C. Durfor, 2/11/99

General and Plastic Surgery Devices Advisory Panel, November 17, 1998

per S Rhodes,.G. Gantt, and C. Durfor, 2/11/99