K983720

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Submitter

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Date Summary Was Prepared

October 21, 1998

Name of Device

Asahi AM-BIO Series Dialyzers

Identification of Predicate Devices

Asahi AM Series Dialyzers
Asahi AM-R Series Dialyzers
Baxter HT Dilayzers
Gambro COBE Centrysystem HG Dialyzers
Gambro Alwall GFS Plus Dialyzers

Description of the Device

The line of Asahi AM-BIO Series Dialyzers is a family of hemodialysis membranes, or hollow fiber dialyzers developed to provide safe and effective hemodialysis over ranges of dialyzer patient treatment requirements. The device is intended for use in patients who have chronic renal failure or acute renal failure, for both single or initial use and when reprocessed for reuse for a maximum of 15 reprocessing reuse cycles on the same patient.

The membrane fibers are made of modified cellulose (i.e., alkyl ether polymer grafted cellulose), derived from cuprammonium rayon. The cuprammonium rayon is manufactured to have a thin layer of modified cellulose exposed to blood contact surfaces. The modification to the cellulose yields the fiber more compatible to the patient's blood, manifested through lower complement activation ($C3_a$ and $C5_a$) when compared to regular cellulose membrane dialyzers.

The membranes are housed within a plastic casing of styrene butadiene block polymer. Non-removable casing end caps are also made of styrene butadiene block polymer. The potting material (sealant) is polyurethane and the port caps (stoppers) are made of hydrogenated styrene butadiene block polymer. The AM-BIO Series Dialyzers will be offered for sale in both a "wet" model and a "dry" model. The wet and dry dialyzers are identical to each other except that the wet models are filled at the factory with a fluid to facilitate priming by the user and the dry models are not filled. The use of a wet or dry dialyzer is a matter of user preference. The fluid in wet dialyzers is made of water containing 600 ppm sodium pyrosulfite and 300 ppm sodium carbonate. All Asahi AM-BIO Series Dialyzers are sterilized before shipment by gamma radiation (γ-rays). The dialyzer is no longer sterile after it is accessed for the initial use.

Intended Use

The intended use statement of the Asahi AM-BIO Series Dialyzers reads:

a. Asahi AM-BIO Series Dialyzers are intended for use for hemodialysis treatment of patients who have chronic renal failure or acute renal failure.

b. Asahi AM-BIO Series Dialyzers must be used in accordance with the instructions of a physician familiar with hemodialysis and familiar with the conditions of the patient.

c. Asahi AM-BIO Series Dialyzers have been tested *in vitro* and in confirmatory clinical studies under single or initial use and under reprocessing and reuse conditions for up to 15 reuse cycles. Based on the results from these evaluations, Asahi AM-BIO Series Dialyzers may be reprocessed for reuse on the same patient. If reprocessing and reuse is practiced, it is recommended that the reuse be done under the conditions as existed in the *in vitro* and confirmatory clinical studies undertaken by Asahi and as recommended immediately below. It is noted that the Asahi AM-BIO Series Dialyzers have not been

tested for reuse when reprocessed with agents and/or processes other than these, and the performance of the dialyzers under other conditions are not known and cannot be recommended. Accordingly:

1. The reprocessed dialyzer may be used only if the residual Total Cell Volume (TCV) is at least 80% of the original TCV and if such dialyzer otherwise meets the acceptance criteria of these instructions for use and the instructions of the reprocessing system utilized. Furthermore, the policies, instructions, and criteria of the institution for reuse (e.g., concerning dialyzer performance, residual blood, and/or dialyzer leakage or damage) should be followed.

2. The reprocessing agent may be either (1) 4% formaldehyde (also known as formalin) in conjunction with the Seratronics Dialyzer Reprocessing Systems for Dialyzer Reprocessing and Preparation (DRS4™ and DPS4™), manufactured by Seratronics, Inc., or (2) Renalin® in conjunction with the Renatron® Dialyzer Reprocessing System (RS 8300), manufactured by Renal Systems, Inc.

3. The instructions provided by the manufacturer of the chosen reprocessing agent must be followed in reprocessing the dialyzer.

4. The reprocessed dialyzer may be used only on dialysis systems equipped with volumetric ultrafiltration controllers.

Additionally, the Asahi AM-BIO Series Dialyzers exhibit enhanced hemocompatibiltiy when compared to dialyzers of regular membrane materials and when compared to other dialyzers of hemocompatible membrane materials.

Comparison of Device Characteristics to Predicates

The indications for use, design, and manufacturing of the Asahi AM-BIO Series Dialyzers are the same as the predicate devices (i.e., Asahi AM Series Dialyzers and AM-R Series Dialyzers as well as hemophan dialyzers: Baxter HT Dialyzers, Gambro COBE Centrysystem HG Dialyzers, and Gambro Alwall GFS Plus Dialyzers).

The AM-BIO Series Dialyzers differ from the Asahi AM-Series Dialyzers and AM-R Series Dialyzers (i.e., predicate Asahi devices) in that they have slightly different casing dimensions and they utilize a membrane material (i.e., surface modified cellulose derived from cuprammonium rayon) that is more compatible to the patient's blood, generally manifested through lower complement activation ($C3_a$ and $C5_a$) compared with regular cellulose membranes. Therefore, from the perspective of technological characteristics, the AM-BIO Series Dialyzers under this 510(k) are substantially equivalent to predicate devices.

The performance characteristics of the AM-BIO Series Dialyzers for single or initial (first) use and after reprocessing for reuse, as reflected in the biocompatibility testing, *in vitro* performance testing, and confirmatory clinical testing, are comparable to the performance characteristics for single or initial (first) use of the Asahi and competitor predicate devices. The single or initial (first) use as well as reuse performance characteristics will be included in device labeling to provide clinical users with accurate information in the comparable performance of these conventional hemodialysis membranes. Therefore, from the perspective of performance characteristics, the AM-BIO Series Dialyzers under this 510(k) are substantially equivalent to the predicate devices (i.e., Asahi AM Series and AM-R Series Dialyzers and hemophan dialyzers: Baxter HT Dialyzers, Gambro COBE Centrysystem HG Dialyzers, and Gambro Alwall GFS Plus Dialyzers).

Therefore, the family of AM-BIO Series Dialyzers that are the subject of this 510(k), when indicated for single use or initial (first) use as well as for reprocessing and reuse are substantially equivalent to currently marketed conventional hemodialyzers.

Additionally, enhanced hemocompatibility has been demonstrated by showing lower complement activation ($C3_a$ and $C5_a$) when compared to regular cellulose membranes as well as when compared to a currently marketed hemodialyzer membranes bearing labeling claims for enhanced hemocompatibility.

Non-clinical Testing

The performance of the Asahi AM-BIO Series Dialyzers under reuse conditions were evaluated according to the FDA's May 23, 1996, letter to industry and its accompanying *Guidance for*

Hemodialyzer Reuse Labeling. Accordingly, the performance testing that has been conducted includes:

(4) The largest wet model (AM-BIO-100) has been subjected to the reprocessing agents and/or processes for 15 cycles and subsequently tested for biocompatibility. The biocompatibility tests comprised: cytotoxicity, sensitization, irritation or intracutaneous reactivity, systemic toxicity (acute), genotoxicity, hemocompatibility, and pyrogenicity.

(5) The smallest wet model (AM-BIO-50) and the largest wet model (AM-BIO-100) have been tested *in vitro* under initial use and reprocessed/reused conditions for 15 cycles using outdated human blood from a blood bank to produce *in vitro* measurements of ultrafiltration coefficient (K_{UF}) and clearances for urea, creatinine, and vitamin B_{12}. Reflecting the dominant use pattern in modern hemodialysis facitlities, the *in vitro* performance testing was performed using dialysis machines equipped with volumetric ultrafiltration controllers. Also to evaluate the effects of reprocessing, widely utilized reprocessing agents formaldehyde (also known as formalin) and Renalin® and associated reprocessing systems were utilized.

Clinical Testing

The largest wet model (AM-BIO-100) has been tested in a confirmatory clinical study under initial use and reprocessed/reused conditions to produce clinical measurements of ultrafiltration coefficient (K_{UF}) and removal rates for urea, creatinine, and albumin.

An objective of the study was to demonstrate safety of the device by characterizing the effect of repeated patient exposures by treating subjects 36 consecutive times with the device, as recommended by FDA. Other objectives of the study were (1) quantitate the low molecular weight substance removal performance and the ultrafiltration coefficient (K_{UF}) of the Asahi AM-BIO-100 dialyzer upon initial use, and (2) to demonstrate that these indices of performance remain acceptable after reprocessing and reuse, to a maximum of 15 reprocessing/reuse cycles per patient.

Lastly, the study was to document complement activation (C3a and C5a) during the course of the study.

Two clinical sites were chosen to study the effects of reprocessing the dialyzer with the two chosen reprocessing agents and/or processes. The clinical study protocol was identical for both sites, although dialysis sessions were conducted and patients were managed in accordance with established dialysis practices for the respective institutions.

The study was prospective in design. The initial dialysis procedures served as the baselines for comparison for the subsequent dialysis procedures performed with the reprocessed devices. The study continued at each site until 12 patients were enrolled at the site, of which all were intended to be treated 36 consecutive times with the dialyzer while reusing a subject's unit up to 15 times. The main inclusion criteria were patients who receive chronic dialysis and who are stable on thrice weekly dialysis.

Conclusions

The indications for use, design, and manufacturing of the Asahi AM-BIO Series Dialyzers are the same as the predicate devices (i.e., Asahi AM Series Dialyzers and AM-R Series Dialyzers as well as hemophan dialyzers: Baxter HT Dialyzers, Gambro COBE Centrysystem HG Dialyzers, and Gambro Alwall GFS Plus Dialyzers). The AM-BIO Series Dialyzers differ from the Asahi AM-Series Dialyzers and AM-R Series Dialyzers (i.e., predicate devices) in that they have slightly different casing dimensions and they utilize a membrane material (i.e., surface modified cellulose derived from cuprammonium rayon) that is more compatible to the patient's blood, generally manifested through lower complement activation ($C3_a$ and $C5_a$) compared with regular cellulose membranes. Therefore, from the perspective of technological characteristics, the AM-BIO Series Dialyzers under this 510(k) are substantially equivalent to the predicate devices.

The performance characteristics of the AM-BIO Series Dialyzers for single or initial (first) use and after reprocessing for reuse, as reflected in the biocompatibility testing, *in vitro* performance testing, and confirmatory clinical testing, are comparable to single or initial (first) use performance characteristics of predicate devices. The single or initial (first) use as well as reuse performance characteristics will be included in device labeling providing clinical users with accurate

information in the comparable performance of these conventional hemodialyzers. Therefore, from the perspective of performance characteristics, the AM-BIO Series Dialyzers under this 510(k) are substantially equivalent to the predicate devices (i.e., Asahi AM-R Series Dialyzers and hemophan dialyzers: Baxter HT Dialyzers, Gambro COBE Centrysystem HG Dialyzers, and Gambro Alwall GFS Plus Dialyzers).

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DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

Food and Drug Administration
9200 Corporate Boulevard
Rockville MD 20850

MAY 17 1999

Asahi Medical Company, LTD.
c/o David L. West, Ph.D.
Quintiles Medical Technology Consultants
15825 Shady Grove Road, Suite 90
Rockville, MD 20850

Re: K983720
Asahi AM-BIOSeries Dialyzers
Models 50, 50D, 65, 65D, 75, 75D,
100 and 100D
Multiple Use Labeling
Dated: February 18, 1999
Received: February 18, 1999
Regulatory Class: II
21 CFR 876.5820/Procode: 78 MSE

Dear Dr. West:

We have reviewed your Section 510(k) notification of intent to market the device referenced above and we have determined the device is substantially equivalent (for the indications for use stated in the enclosure) to legally marketed predicate devices marketed in interstate commerce prior to May 28, 1976, the enactment date of the Medical Device Amendments, or to devices that have been reclassified in accordance with the provisions of the Federal Food, Drug, and Cosmetic Act (Act). You may, therefore, market the device, subject to the general controls provisions of the Act. The general controls provisions of the Act include requirements for annual registration, listing of devices, good manufacturing practice, labeling, and prohibitions against misbranding and adulteration.

If your device is classified (see above) into either class II (Special Controls) or class III (Premarket Approval), it may be subject to such additional controls. Existing major regulations affecting your device can be found in the Code of Federal Regulations, Title 21, Parts 800 to 895. A substantially equivalent determination assumes compliance with the Current Good Manufacturing Practice requirements, as set forth in the Quality System Regulation (QS) for Medical Devices: General regulation (21 CFR Part 820) and that, through periodic QS inspections, the Food and Drug Administration (FDA) will verify such assumptions. Failure to comply with the GMP regulation may result in regulatory action. In addition, FDA may publish further announcements concerning your device in the Federal Register. Please note: this response to your premarket notification submission does not affect any obligation you might have under sections 531 through 542 of the Act for devices under the Electronic Product Radiation Control provisions, or other Federal laws or regulations.

This letter will allow you to begin marketing your device as described in your 510(k) premarket notification. The FDA finding of substantial equivalence of your device to a legally marketed predicate device results in a classification for your device and thus, permits your device to proceed to the market.

If you desire specific advice for your device on our labeling regulation (21 CFR Part 801 and additionally 809.10 for in vitro diagnostic devices), please contact the Office of Compliance at (301) 594-4613. Additionally, for questions on the promotion and advertising of your device, please contact the Office of Compliance at (301) 594-4639. Also, please note the regulation entitled, "Misbranding by reference to premarket notification"(21 CFR 807.97). Other general information on your responsibilities under the Act may be obtained from the Division of Small Manufacturers Assistance at its toll-free number (800) 638-2041 or (301) 443-6597, or at its internet address "http://www.fda.gov/cdrh/dsma/dsmamain.html".

Sincerely yours,

CAPT Daniel G. Schultz, M.D.
Acting Director, Division of Reproductive,
Abdominal, Ear, Nose and Throat,
and Radiological Devices
Office of Device Evaluation
Center for Devices and
Radiological Health

Enclosure

510(k) Number
None assigned as of this time

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Device Name
Asahi AM-BIO Series Dialyzers

Indications for Use

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b. Asahi AM-BIO Series Dialyzers must be used in accordance with the instructions of a physician familiar with hemodialysis and familiar with the conditions of the patient.

c. Asahi AM-BIO Series-Dialyzers have been tested *in vitro* and in confirmatory clinical studies under single or initial use and under reprocessing and reuse conditions for up to 15 reuse cycles. Based on the results from these evaluations, Asahi AM-BIO Series Dialyzers may be reprocessed for reuse on the same patient. If reprocessing and reuse is practiced, it is recommended that the reuse be done under the conditions as existed in the *in vitro* and confirmatory clinical studies as recommended immediately below. It is noted that the Asahi AM-BIO Series Dialyzers have not been tested for reuse when reprocessed with agents and/or processes other than these, and the performance of the dialyzers under other conditions are not known and cannot be recommended. Accordingly:

1. The reprocessed dialyzer may be used only if the residual Total Cell Volume (TCV) is at least 80% of the original TCV and if such dialyzer otherwise meets the acceptance criteria of these instructions for use and the instructions of the reprocessing system utilized. Furthermore, the policies, instructions, and criteria of the institution for reuse (e.g., concerning dialyzer performance, residual blood, and/or dialyzer leakage or damage) should be followed.

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3. The instructions provided by the manufacturer of the chosen reprocessing agent must be followed in reprocessing the dialyzer.

4. The reprocessed dialyzer may be used only on dialysis systems equipped with volumetric ultrafiltration controllers.

Concurrence of CDRH, Office of Device Evaluation (ODE)

☑ Prescription Use (per 21 CFR 801.109)

☐ Over-the Counter Use

(Division Sign-Off)
Division of Reproductive, Abdominal, ENT,
and Radiological Devices
510(k) Number K983720