



Arterial Stiffness Index

By J.R. Greenwood, Ph.D., Senior Vice-President

In addition to blood pressure and pulse information, the CardioVision® also generates information on the stiffness or flexibility of the brachial artery. Called the Arterial Stiffness Index (ASI), the ASI is a number that correlates with arteriosclerosis. Because arteriosclerosis reduces flexibility in arteries, the higher the ASI, the more likely someone is to have hardening of the arteries, the lower the number, the less likely.

Why is it important to know how flexible arteries are? Arteries are responsible for moving the majority of the blood through the vascular tree. Consequently, non-flexible or hardened arteries cause the heart to work much harder when it is forced to push blood through partially occluded vessels. This extra strain on the heart and the resulting blockages are a root cause of cardiovascular disease. Until the invention of CardioVision®, there was no easy, inexpensive or quick way to determine if a person's vessels had lost flexibility. Many people are never aware that they are walking around with this "silent killer" until they experience their first heart attack from occluded vessels. It has been estimated that 60-70 million Americans harbor this silent killer and should make both life-style changes, such as getting more exercise, changing their diet, quitting smoking, and reducing their cholesterol. While everyone needs to adopt these changes, sometimes life-style changes alone are not enough. CardioVision® identifies people who don't even think they have a cardiovascular problem because they are non-smokers and exercise regularly and watch their diet. Consequently, the ASI can be viewed as another cardiovascular "risk factor", just like high blood pressure or a cholesterol level above 200. Additionally, we think that the ASI can be used to follow cholesterol lowering therapy and other "risk factor" changes.

Establishing an Arterial Stiffness Baseline & Using CardioVision® Results

Arterial Stiffness Index (ASI) is a dynamic physiologic quantitative value. It can and should be compared to measuring cardiac output by the invasive thermo dilution technique using a Swan-Ganz catheter. CardioVision® does not measure cardiac output, but the averaging technique is similar. Since the variation in values obtained can change so rapidly the test is run three to five times and then averaged. If any value is more than 50% above or below average it is rejected and the test is run again and averaged. This procedure is repeated until all results fall within accepted range and then the average is the output (The Stiffness Index). The value you receive can now be used to follow specific treatments or life style changes that are intended to produce improved cardiovascular elasticity and health.

Cardiovision® is an extremely sensitive device and when used properly will provide valuable and sensitive information to the physician or other healthcare provider. When used as a screening device it non-invasively indicates whether further testing (evaluation) may be required because of hypertension or dysfunctional arteries. A high to very high ASI value indicates a high to very high risk of coronary artery disease. When added to other risk factors it will help the physician make a decision as to what future tests should be done. When the test indicates moderate hardening of the arteries the individual should be advised to make life style changes to stop further deterioration of the arteries and of course should be followed up at least semi-annually as to results.

Donald E. Rediker, M.D., F.A.C.C., Medical Advisor, IMDP, Inc., recommends the following ASI /Coronary Artery Disease Risk (CAD) Factor Correlation:

ASI Range	CAD Risk Factor
0 –80	None
81 – 209	Moderate
210 – 309	High
Above 310	Very High

Page 6 contains an ASI Graph by Dr. Hideaki Shimazu, inventor of the CardioVision®, which shows how the ASI is derived. The ASI on four patients with normal to severely decreased elasticity is displayed. The steeper slope on patient #4 (Artery –4) represents increased stiffness (higher ASI) and the lesser slope on patient #1 (Artery –1) indicates normal stiffness (lower ASI). The ASI, expressed in mmHg X 10, is obtained when the pressure/volume relationship beginning at the mean arterial pressure is no longer linear as the cuff pressure is released.

Selected References

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**CardioVision® Produces an Arterial Stiffness Index (ASI) as Graphed Below
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