

# Thromboxane (11dhTx<sub>B2</sub>) Case Studies in Interventional Medicine



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The Boone Heart Institute was established in September of 2008 by Jeffrey L. Boone, MD, a Pioneer in Preventive Cardiology, Cardiometabolic Health, and Stress Medicine. With the help of his sons, Parker and Tyler, Dr. Boone founded the Boone Heart Institute as a platform to increase his impact on the changing landscape health care through his message of prevention. Since 2008, the Boone Heart Institute has expanded their offices, hired additional medical team members, and tested over 2,500 people in the clinic and in screenings nationwide. The Institute offers world-class executive examinations, as well as lower-cost heart health screenings, all designed to eradicate the number one killer in the world: heart attack and stroke.

Using cutting edge technology, the Boone Heart Institute is constantly developing innovative ways of analyzing and treating the major risk factors for heart disease. The unrivaled treatment options offered by the institute can even work to reverse these risk factors and effectively decrease what Dr. Boone calls your “arterial age”. Because of these amazing treatments, the Boone Heart Institute has never once had any patient under their care suffer a heart attack or stroke. And they plan to keep it that way. As Dr. Boone says, *“No one should ever die of a heart attack.”*

Dr. Boone’s unique clinical approach focuses on aggressive prevention of cardiovascular disease, including the evaluation of the cardiovascular consequences of mental stress, the early clinical use of the latest cardiac imaging techniques, and the advanced detection and treatment of cardiometabolic risk.

Dr. Boone is a Member of the NFL Cardiovascular Committee and a Consultant in Preventive Cardiology, Cardiometabolic Risk and Stress Medicine to the Denver Broncos and Colorado Rockies. He has been named one of Men’s Health Magazine’s Top Doctors for Men in 2007 and is listed as one of the 17 Top Cardiovascular Doctors in America.

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## Case Study #1

### Female Entrepreneur Successfully Battling Weight Issues

#### Bio

- 56 Year Old Female (Caucasian)
- Grew up in the Deep South
- Wife of successful national financial executive
- Has battled lifelong weight issues. Had some success with Weight Watchers, but still has 20 pounds to lose.
- Strong family history of heart disease from both sides
  - Mother with high blood pressure
  - Father with stroke and heart attack

#### Evaluation

- Experienced musculoskeletal side effects with atorvastatin (Lipitor®) and simvastatin (Zocor®). Now trying 5 mg rosuvastatin (Crestor®) twice weekly.
- On a daily acetylsalicylic acid (Aspirin™) 81 mg and multivitamin.
- An atherosclerotic lesion was noted in the right carotid artery bulb. The lesion measured approximately 30% stenosis.

#### Treatment Prior to Initial Consultation

- Rosuvastatin (Crestor®) 5mg twice weekly
- acetylsalicylic acid (Aspirin™) 81 mg Daily
- Daily multivitamin

#### New Treatment Plan

- Rosuvastatin (Crestor®) 10mg Daily
- Antioxidant Multivitamin Micronutrient (Multimmunity) AM & PM (Boone Heart Institute formulation, [www.multimmunity.com](http://www.multimmunity.com))
- Vitamin D3 2000 IU Daily
- Omega 3 capsule AM & PM
- Double acetylsalicylic acid (Aspirin™) to 162 mg daily
- Daily Citrus Pectin

#### Treatment Plan After 3 Month Follow Up

- Increase Rosuvastatin (Crestor®) to 20mg Daily
- Add niacin (Niaspan®) 1000 mg Daily for Lipoprotein(a)
- Consider choleseverlam (Welchol®) for sterol absorption

Biomarkers	Initial Evaluation	3 Months Later	Biomarkers	Initial Evaluation	3 Months Later
AspirinWorks® (11dhTxB <sub>2</sub> ) (urine) (pg/mg of creatinine)	1412	443	NT-proBNP (pg/mL)	17	15
Total Cholesterol (mg/dL)	263	170	Galectin-3 (ng/mL)	23.8	15.6
LDL-C (mg/dL)	174	104	Cardiac Troponin-I (pg/mL)	0.7	1.0
HDL-C (mg/dL)	75	61	Interleukin-6 (pg/mL)	0.5	3.1
Triglycerides (mg/dL)	95	55	Interleukin-17A (pg/mL)	0.1	0.2
Non-HDL-C (mg/dL) (calculated)	189	110	TNF (pg/mL)	2.7	2.3
Apo B (mg/dL)	140	86	Body Mass index (BMI)	29	29
LDL-P (nmol/L)	1975	1491	SBP/DBP (sitting)	120/84	116/79
Small LDL-P (nmol/L)	560	158	HgbA1c (%)	5.4%	5.3%
Apo A-I (mg/dL)	162	150	Homocysteine (µmol/L)	16	7
HDL-P (nmol/L)	41.7	36.3	25-Hydroxy-Vitamin D (ng/mL)	34	51
HDL2-C (mg/dL)	28	19	Omega3 Index (%)	5.0%	6.5%
Lp(a) Mass (mg/dL)	68	57	Campesterol (µg/mL)	4.47	3.92
Lp(a)-P (nmol/L)	281	167	Sitosterol (µg/mL)	3.88	3.42
Myeloperoxidase (pmol/L)	384	204	Carotid Plaque	30%	(follow up (Right) in 1 year)
Lp-PLA <sub>2</sub> (ng/mL)	188	162	Carotid Intima Media Thickness	0.512 mm	(follow up in 1 year)
hs-CRP (mg/L)	1.1	1.2			
Fibrinogen (mg/dL)	458	396			

Case study is provided for educational purposes to show how the 11dhTxB<sub>2</sub> test kit is being used in clinical practice. Refer to Case Study #3 for 11dhTxB<sub>2</sub> Intended Use

## Case Study #2

### Fit Physician with Ominous Warnings

#### Bio

- 59 Year Old Male Anesthesiologist (Caucasian)
- Very fit, lean, and healthy
- Recently moved from Texas to Colorado
- History of severe dyslipidemia with family history of heart disease in mother and father (total cholesterol of 325 mg/dL on 12/23/11)
- Patient was using only herbal treatments at that point

#### Evaluation

- Evaluation at Boone Heart Institute revealed the presence of vulnerable obstructive right carotid plaque at 25% stenosis. This atherosclerotic abnormality coupled with severe biomarker results prompted aggressive therapy.
- Apo E3/E4 Genotype may have some association with both atherosclerosis and dementia and deserves aggressive preventive vascular and biomarker control strategies

#### New Treatment Plan

- Started new treatment plan on 12/23/11
- Atorvastatin (Lipitor®) 40 mg Daily
- Started at a high dose of acetylsalicylic acid (Aspirin™) 325 mg Daily because of severe elevation of AspirinWorks® (11dhTxB<sub>2</sub>) at 2760 pg/mg of creatinine
- Added Antioxidant Multivitamin Micronutrient (Multimmunity) AM & PM (Boone Heart Institute formulation, [www.multimmunity.com](http://www.multimmunity.com)), for increased homocysteine at 15 due to MTHFR (methyltetrahydrofolate reductase) A/C Genotype
- Patient had an incredible response to therapy, as shown in table below:

Biomarkers	Initial Evaluation	3 Months Later	Biomarkers	Initial Evaluation	3 Months Later
Age	59	60	AspirinWorks® (11dhTxB <sub>2</sub> ) (urine) (pg/mg of creatinine)	2760	536
Arterial Age	45	44	hs-CRP (mg/L)	0.8	1.0
Carotid Plaque	Right - Vulnerable, soft plaque. 25%	Right - Mixed calcified and soft plaque. 24%	Lp-PLA <sub>2</sub> (ng/mL)	158	183
CCA Mean Intima Media Thickness	0.641 mm	0.635 mm	Apo E3/E4 Genotype	3/4	
CCA Max Region Intima Media Thickness	0.728 mm	0.721 mm	MTHFR Genotype	A/C	
Body Mass Index	28	28	Cystatin C (mg/dL)	1.21	1.09
Total Cholesterol (mg/dL)	325	144	25-Hydroxy-Vitamin D (ng/mL)	44	119
LDL-Cholesterol (mg/dL)	202	87	HgbAlc (%)	5.0%	5.5%
LDL-P (nmol/L)	2291	989	Insulin (µU/mL)	7	5
HDL-Cholesterol (mg/dL)	49	40	Homocysteine (µmol/L)	14	12
Triglycerides (mg/dL)	238	97	Cardiac Troponin-I	1.0	0.8
			Interleukin-6 (pg/mL)	1.6	1.7
			Interleukin-17A (pg/mL)	0.4	0.6
			TNFα(alpha) (pg/mL)	2.6	2.0

## Case Study #3

### Besieged Female CEO with Litigious Partners

#### Bio

- 56 year old female (Caucasian)
- CEO of three small companies
- Very high stress, due to lawsuit brought against her by former business partner

#### Evaluation

- Coronary calcium score of 464
- Right-sided carotid plaque measuring 76% stenosis
- Two left-sided carotid plaques at 20% and 16% occlusion, respectively.
- Dyslipidemia already partially treated with rosuvastatin (Crestor®) 40 mg daily with Total Cholesterol at 190 ng/dL

#### Treatment Prior to Initial Consultation

- Rosuvastatin (Crestor®) 40 mg daily

#### New Treatment Plan

- Added olmesartan (Benicar®) 20mg Daily for blood pressure elevation and elevated NT ProBNP
- Started high-dose acetylsalicylic acid (Aspirin™) therapy at 325 mg Daily after initial 2 weeks therapy with acetylsalicylic acid (Aspirin™) 81 mg Daily lowered 11dhTx<sub>B</sub><sub>2</sub>/Cr Ratio from 5003 to 2128. With her severe atherosclerotic risk, I would like this urinary measurement of thromboxane metabolites- AspirinWorks® (11dhTx<sub>B</sub><sub>2</sub>) near 500
- Added choleseverlam (Welchol®) 3.75 mg daily for sterol absorption and cholesterol control

Biomarkers	Initial Evaluation	2 Weeks Later	Biomarkers	Initial Evaluation	2 Weeks Later
AspirinWorks® (11dhTx <sub>B</sub> <sub>2</sub> ) (urine) (pg/mg of creatinine)	5003	2128	Interleukin-17A (pg/mL)	0.1	
Lp-PLA2 (ng/mL)	157		TNF-alpha (pg/mL)	2.4	
hs-CRP (mg/L)	1.8		Cystatin C (mg/mL)	0.72	
Total Cholesterol (mg/dL)	190		Sitting SBP/DBP	148/87	128/76
LDL-C (mg/dL)	99		Mathematics Stress SBP/DBP	149/95	136/85
LDL-P (nmol/L)	1297		Omega3 Index (%)	7.9%	
Small LDL-P (nmol/mL)	90		25-Hydroxy-Vitamin D (ng/mL)	79	
HDL-C (mg/dL)	87		Campesterol (µg/mL)	7.43	
NT-proBNP (pg/mL)	178		Sitosterol (µg/mL)	8.13	
Galactin-3 (ng/mL)	15.2		Cholestanol (µg/mL)	5.81	
Cardiac Troponin IgG/mL	0.8		Homocysteine (µmol/L)	9	
Interleukin-6 (pg/mL)	1.6		HgbA1c (%)	5.6%	
			Insulin (µU/mL)	4	

Case study is provided for educational purposes to show how the 11dhTx<sub>B</sub><sub>2</sub> test kit is being used in clinical practice.

The Intended Use for the 11dhTx<sub>B</sub><sub>2</sub> test kit is as follows:

The 11dhTx<sub>B</sub><sub>2</sub> Test Kit is an enzyme-linked immunoassay (ELISA) to determine levels of 11-Dehydro Thromboxane B<sub>2</sub> (11dhTx<sub>B</sub><sub>2</sub>) in human urine, which aids in the qualitative detection of acetylsalicylic acid (ASA) effect in apparently healthy individuals post ingestion. For professional use only.



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