

How Do You Cure a Broken Heart?



PHOTOGRAPH BY JERRY NEBLETT / U.S. NAVY

When Karen Schillings learned that her daughter and soon-to-be son-in-law had died in a freak boat accident, her strong heart threatened to stop beating. Fortunately for her, doctors from Johns Hopkins knew just what to do By **April Witt**



Karen Schillings
endured terrible
trauma when a water
taxi capsized in
Baltimore's harbor
and five people died.
Opposite: Passengers
clinging to the boat
on March 6, 2004.

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IT IS THE MOST BEAUTIFUL SPRING AFTERNOON. Sunshine glints off water in the harbor. Karen Schillings, 55, wears a light jacket in case it gets chilly. The Girl Scout leader from Homewood, Ill., is always prepared. But it has been mild all day, and Karen feels almost luxuriantly relaxed as she strolls the grounds of historic Fort McHenry in Baltimore.

Up ahead, Karen's youngest daughter walks hand in hand with her boyfriend. Corinne Schillings and Andrew Roccella, both 26, lean into each other laughing. They are so in love they are in their own little world, Karen thinks, pleased.

Corinne and Andrew have been in love for years. They've been in love since the year after they met as Purdue University juniors studying in Italy. They've been in love so long that one of Corinne's girlfriends teases that she has a mind to telephone Andrew and demand he pop the question. Corinne, cheerful and steady like Mom, always says she is certain Andrew will propose when he is ready — and whenever that is will be just the right time.

It is Saturday, March 6, 2004.

At 3:23 p.m., a wind gauge atop a Howard County middle school — 30 miles from the fort — records 57 mph gusts. A fast-moving line of thunderstorms is sweeping across Maryland, heading for Baltimore.

The harbor is calm as the young lovers, who have brought their parents together for a day of sightseeing, wait on the Fort McHenry pier for a water taxi to take the three couples back across the water to Fells Point.

Sitting on a bench on the pier, Corinne shows off little treasures she's picked up at the fort gift shop: a book on the history of the early American stronghold that inspired "The Star-Spangled Banner," and a commemorative brass Christmas ornament. Corinne is an accomplished young woman who speaks five languages, but she's still a little girl about her favorite holiday. Wherever she travels in the world she buys sentimental baubles to hang on the family Christmas tree.

It is beginning to look like rain. The sky darkens, and a cool breeze appears. Karen wishes the water taxi would hurry up and get there or they'll all get wet. She notices that Andrew isn't wearing a jacket, and worries he'll be cold. "Oh, these young kids, they never have their jackets on!" she thinks.

"You know how the mom in you comes out," Karen says months later, recounting that day in an interview.

Karen feels lucky when the Lady D, a 36-foot pontoon boat with a two-man crew, docks, boards its maximum 23 passengers

and pulls away from the pier just ahead of the rain. Seconds later, the heavens open. Sightseers aboard the water taxi gasp and exclaim excitedly about the sheeting rain.

It is just before 4 p.m. — about the time the National Weather Service issues a warning of possible thunderstorms in the area with gusting winds.

As the water taxi pulls farther from land, the wind picks up suddenly. The harbor is instantly choppy, and the small pontoon boat, just 12 feet across, begins to rock violently.

Beneath the enclosed canopy of the Lady D, concerned passengers fall silent as they face each other from two benches running the length of the vessel. One strong gust lifts the port pontoon right out of the water, tilting the vessel alarmingly, Andrew's father, Edward Roccella, recalls later. Someone screams as passengers from the starboard bench rush to throw their weight portside to help right the boat.

The sudden squall is too much for the small boat. The water taxi is more than 100 yards from shore when the captain veers to try to return to land. As the vessel comes round, a powerful gust catches it broadside, flipping the two-ton craft upside down as if it were a paper boat. Corinne and Andrew, sitting on the starboard bench next to a small boy, flip over backward into the water. The cabin, suddenly submerged, fills with icy water. Passengers and crew tumble helplessly like laundry in a washing machine.

Our Father, who art in Heaven . . . Karen finds herself silently praying as the cold, black water engulfs her. After 55 years of weekly Mass, the familiar prayer comes unbidden.

She wills herself not to take another breath. If she breathes, she tells herself, she dies.

Years of scouting, water safety talks and contingency planning come back to her now as a single thought: air pocket. Karen struggles upward in search of a pocket of trapped air where she can safely draw breath. She feels the top of her head hit what had been the cabin floor. There is no air, only dark water surrounding her face.

She knows she has to go down and find a window to get out. Adrenaline is surging through her body, making her heart beat faster, pumping more blood to energize all her muscles.

"Don't breathe," she orders herself. "If I pass out, I pass out. I'll go that way," she thinks. "But I am not going to breathe."

All around her, passengers trapped in the submerged cabin struggle to find their own way out. Karen can't see them. She can't see anything in the black water.

She feels her way along one wall until her fingers find a window. It is closed. She tries opening it, but it doesn't budge.

Struggling not to submit to panic and the urgency of her lungs, Karen bangs on the window. At 5-foot-1, Karen isn't physically strong, but she is determined. She alternately shoves at the window and kicks as she prays.



Ilan Wittstein, a Johns Hopkins cardiologist, is interested in the prosaic and the poetic concepts of the heart.

"I remember telling myself and God, 'This isn't the way I want to go. I have too many things in my life I have to do yet. So help me get through this.'" Karen's daughters are grown now, but they still need Mom. Karen shoves at the window with all her might.

She has a husband who loves her and has kept her safe through 33 years of marriage. She gives the window another shove.

She has a tidy ranch home where the front doorbell chimes "Bless This House" and 17 packed photo albums line a shelf in the den. She shoves at the window.

She has friends and neighbors who count on her to bake 175 dozen cookies every Christmas. She shoves at the window.

In the darkness, Karen feels something brush across her face. It is a life vest. She clutches it and feels a surge of hope. She pushes on the window until she feels it give way. The window doesn't open. It falls out and floats away.

DR. ILAN WITTSTEIN IS A STUDENT OF THE HEART.

The son of a rabbi, he studied Sufi mysticism and jazz guitar in college along with molecular biology. Now he's a respected cardiologist at one of the world's leading centers of medical science, Johns Hopkins University.

Perusing bookstores off-hours, he's as likely to reach for a tome exploring the brain-wave patterns of meditating monks as he is a more conventional science text, he says. He doesn't think it's a waste of time when he reads that a Harvard neurologist has studied the phenomenon of voodoo deaths — seemingly healthy people who drop dead after learning they've supposedly been hexed. He thinks that's very interesting.

Wittstein is as fascinated by the power of the mind as by the beating of the heart. He wants to know how what people think affects them physiologically.

The current is stronger than

Eisenstein anticipated. He lets go of the woman's inert body, and shouts for someone to throw him a line.

In the prosaic language of a modern science textbook, the heart is a pump: a contracting muscle that pumps blood to the lungs to pick up oxygen, then keeps on pumping to deliver that oxygen-rich blood to the rest of the body.

Yet poets and philosophers since antiquity have debated the heart's role as the seat of the soul and the font of passionate emotions, from anger and pride to courage, valor and grief. In "The Iliad," the Greek poet Homer described hearts black with rage, dripping with a righteous vengeance as sweet as honey or cramping in anguish. More than 2,000 years later, William Shakespeare often evoked hearts so overcome with emotion that they shatter. In "Macbeth," he wrote: "Give sorrow words: the grief that does not speak / Whispers the o'er-fraught heart, and bids it break."

Wittstein is interested in both the prosaic and poetic concepts of the heart. He wants to know how to measure and quantify where the two hearts meet.

The cardiologist was 35 years old in 1998, and had only recently joined the teaching staff at Johns Hopkins School of Medicine as an assistant professor, he says, when a brief entry in the journal *Circulation* caught his attention. It was titled "A Broken Heart."

The article, just a few paragraphs, summarized the case of a woman whose reaction to her husband's sudden death seemed like something out of a love sonnet, not a medical journal: The beating of her heart became dangerously weak. The woman's doctor was pretty confident his patient hadn't had a heart attack, because her

THE BOAT SEEMS FAR AWAY. The storm has blown the wreckage of the Lady D several yards from where Karen surfaces, gasping.

Karen is cold. She will say later that she has never been so cold in her life. Swimming through the rough chop seems impossible. She doesn't know how long she can survive treading here in the frigid water. She has no choice. She clutches the life vest in front of her and kicks furiously toward the overturned pontoon boat.

Karen spots her husband, Denny, clinging to a rope off the side of the wreckage. Denny sees Karen, too, and calls to her, urging her on.

Dazed survivors have climbed on top of the overturned vessel, and are hauling others up behind them, Karen and Denny recall later.

George Bentrem, a 39-year-old doctor from Harrisonburg, Va., surfaces but doesn't see his wife or young children. He goes back under the boat.

Edward Roccella is on top of the capsized boat yelling frantically for Andrew and Corinne. "Where are the kids?" he shouts to Denny, who is still in the water. "I can't see the kids! Where are the kids?" Denny slips below the surface to look for them. The water is so dark it's like trying to see through black coffee.

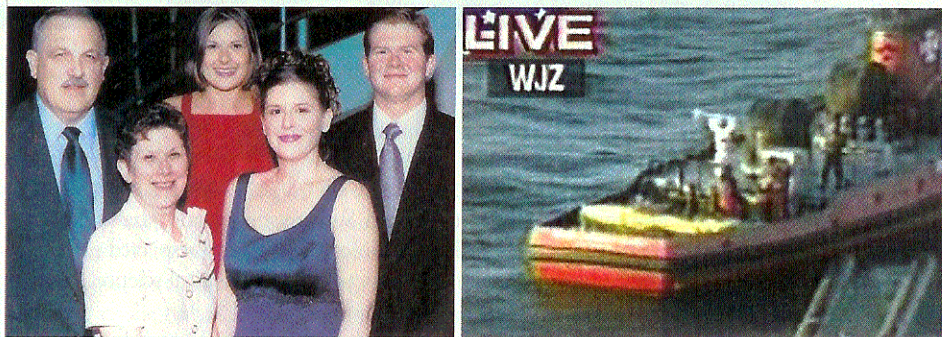
Nearby, the doctor from Harrisonburg is also frantic. He's found his wife and 7-year-old daughter, but not his other two children, Sarah, 8, and Daniel, 6.

Karen is so exhausted by the time she reaches the Lady D, she doesn't have the strength to pull herself out of the water. Denny helps lift her onto the barnacled wreckage. Some fellow survivors are too stunned to move or speak. Andrew's mother has shattered her shoulder and writhes in pain. Denny stays in the frigid water, searching. Shivering on the upturned hull, Karen surveys the chaos and wonders if anyone knows they are out here and need help.

"Andrew is a strong swimmer," his father, Edward, says hopefully. Andrew, who makes friends easily and is applying to graduate school in conflict management. Andrew, who drives a convertible, owns his own condo and is already too wise to carry credit card debt. Andrew: his only child.

More than 10 minutes after the Lady D capsized, according to res-

cuers, survivors and news accounts, survivors hear the rough chug of a diesel engine and see a 70-foot Navy landing craft approach, its ramp lowered. It looks like the kind of vessel used to land troops on D-Day. On board are several reservists who had just finished training exercises at the nearby Naval Reserve Center when officers standing in an open doorway



From left, Denny, Karen, Denise and Corinne Schillings with Corinne's boyfriend, Andrew Roccella, in 2000, and the capsized boat being recovered in 2004.

heart soon began contracting normally. But he couldn't say for sure what she had suffered other than the obvious: grief.

The case appealed to Wittstein's curiosity at the mysteries of science.

"I wonder," he remembers thinking, "if I'll ever see anything like that."



A surprise 60th birthday party five years ago was almost too much for Margaret Weber's heart to take.

watched the water taxi capsize and raised the alarm.

As the landing craft maneuvers to pull alongside the stranded pontoon boat without smashing into it, reservists scan stricken faces.

Cdr. Petersen Decker hears a man screaming that there are children still trapped in the wreckage, he recalls later in an interview, and he dives into the 44-degree water. Four fellow reservists follow. They wear life vests over their uniforms. None are wearing wet suits. Hypothermia is a risk they are willing to take.

Rescuers who remain on the landing craft form a human chain to help survivors cross over from the wrecked pontoon boat. They greet Lady D passengers too numb to give their names. A man says

he needs to call his parents to tell them he's okay, but can't remember their phone number. A woman hides her head under a tarp because she can't stand to watch.

Decker, 51, plunges underwater repeatedly, searching for a way inside the Lady D. He kicks at the sides of the boat again and again, trying to force an opening. Eventually, he breaks through. He feels his way inside, but can't see anything. The water is too murky.

Coming up for air, Decker hears an order to get out of the cold water. He's been in too long. He tries climbing back onto the landing craft, but the cold has sapped his strength. As fellow

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Heartbreak

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reservists help him up the ramp, Decker passes out from hypothermia.

For the next few minutes, Decker drifts in and out of consciousness. When he comes to, Decker, a Naval reservist who works in the auto industry in Detroit, realizes he can't feel his hands and he can't stand, he later says. Still, he feels compelled to help. The former Eagle Scout begins crawling on his elbows and knees, making his way to the side of the boat.

Vincent Scardina, Navy senior chief boatswain's mate, positions the naval landing craft's heavy steel ramp under the Lady D, hoping to use it like a lever to lift one pontoon of the overturned vessel. As the taxi rises, it breaks apart. Three freed passengers burst to the surface as if they'd been shot from a cannon. There are two adults, face down, and 8-year-old Sarah Bentrem, floating on her side.

Arthur Eisenstein, 39, a jeweler and lieutenant commander in the Sea Cadets, spots the child and hurls himself into the water. Eisenstein, who once trained as a Navy rescue swimmer, grabs Sarah and one of the adults, a woman, quickly before the current sweeps them away.

The current is stronger than Eisenstein anticipated. He struggles but can't hold on to both the woman and the child, and still make it back to the landing craft. He lets go of the woman's inert body, and shouts for someone to throw him a line.

Decker, despite his hypothermia, has managed to tip himself back into the water. He grabs one of the unconscious women. She's large and heavy. Decker manages to get just close enough to the landing craft that fellow rescuers on deck can pull both him and the woman aboard.

Baltimore Fire Department boats have joined the rescue. Rescuers soon turn their boats back to shore. They can't search anymore. They need to get medical attention for people suffering shock and hypothermia. One of the women pulled from the water is already dead and the other, her daughter, is dying. Sarah's younger brother is still missing along with Andrew and Corinne.

Sarah is blue. She is in cardiac arrest. As rescuers aboard the landing craft struggle to revive the child, Karen stares at her tiny blue body in horror. She thinks of her own two girls at that age. She thinks of all the

Girl Scouts she has known at that age and how cute they are in their uniforms.

Karen huddles close to Andrew's mother, Eileen. Gingerly, Karen puts her arm around the injured woman. Two mothers whose hearts are breaking try to comfort each other.

Eileen tells Karen that Andrew had a beautiful secret. A few days earlier, Andrew had bought Corinne a diamond engagement ring. He was so excited and proud. He was planning to ask Denny's permission the following day. Andrew was finally going to ask Corinne to be his bride.

ILAN WITTSTEIN'S LATEST PATIENT WAS A PUZZLE.

The woman, who lived in Bermuda, had been airlifted to Johns Hopkins Hospital in November 1999 for an emergency heart catheterization.

Admitted to the coronary care unit, the woman looked fine. She was fine. Her tests were coming back perfectly normal, Wittstein says.

Reading the woman's medical records from Bermuda, Wittstein had a hard time believing he was caring for the same patient.

Six days earlier, she had experienced chest pains, prompting her doctors in Bermuda to order a series of tests. Some test results suggested she'd had a serious heart attack. An echocardiogram — a sonar examination of the heart — showed that her left ventricle, the heart's main pumping chamber, was dangerously weak. Her heart muscle was pumping out only half as much blood as it should have been with each contraction. An electrocardiogram (EKG) — which records electrical activity of the heart — also looked strange and scary. It looked like the EKG of someone who'd had a head injury, bled into the brain and produced a massive amount of adrenaline in response to the physical trauma. Only this woman hadn't suffered any blow to her noggin.

Doctors in Bermuda had sent the woman to Hopkins for the catheterization, a procedure they expected to reveal the cause of her presumed heart attack — badly blocked arteries.

But tests at Hopkins showed the woman's arteries wide open, and a new echocardiogram found her heart muscle pumping perfectly well.

That just wasn't supposed to happen.

The heart is surrounded by coronary arteries, which supply it with blood. Diseased coronary arteries are lined with plaque. During a heart attack, a plaque-narrowed artery

ruptures, and a clot forms — stopping blood flow to a portion of the heart. Heart tissue deprived of blood for more than a few minutes dies. Big heart attacks kill lots of cells, which never regenerate. The heart's ability to pump is permanently impaired.

Wittstein wondered if the test results from Bermuda were simply faulty, but a mistake that big seemed highly unlikely.

So he sat down with his patient to try to solve the riddle.

Wittstein likes talking with his patients. He likes listening to people's stories, and culling what they say for clues to their health.

"Tell me exactly what happened," he recalls asking the woman from Bermuda.

The woman had been visiting her ailing mother in the hospital when her mom died. Over the next several hours, the grieving daughter had begun feeling discomfort in her chest. That had led her doctors to perform the tests that had landed her at Hopkins.

Wittstein's best guess was that the arteries surrounding her heart had merely spasmed, temporarily decreasing blood flow to the heart and mimicking the effects of a heart attack.

But he wasn't entirely convinced. "I remember sending her back to Bermuda wondering if this had anything to do with the emotional stress she experienced at her mother's death," he recalls. "Could this be something similar to that case I'd read about back in 1998, 'A Broken Heart'? It's possible. As she left the hospital, my thought was, I may or may not ever see something like this again."

Three days later, he recalls, he did.

IT WAS THANKSGIVING 1999. A woman driving home after a holiday dinner was in a terrifying accident. A car she hadn't seen coming struck her vehicle with such force that it spun her around and sent her hurtling toward a brick wall, brakes screeching. Certain she was going to die, the woman managed to stop her car an instant before ramming the wall.

Paramedics examined her on the scene. The woman was shaken, but didn't appear physically injured. The paramedics wanted her to go to the hospital merely as a precaution. By the time she reached Johns Hopkins more than 30 minutes later, the woman's heart was barely pumping and she struggled to breathe. She was in congestive heart failure. Fluid rapidly filled her lungs. She was basically drowning. If doctors couldn't pull the fluid off her lungs quickly enough with intravenous diuretics, she'd be a candidate for a respirator.

An echocardiogram revealed that nearly all of the woman's heart was motionless. Only the

No matter what heartache had landed these people in the CCU, their situations were so consistent that Wittstein and Champion gave their condition a nickname: "broken heart syndrome."

very base of her left ventricle was still squeezing. Wittstein says he had never seen this pattern of devastation before. It was alarming. It indicated she'd suffered a massive heart attack that would likely change her life forever.

So when the woman's blood test results came back, Wittstein says, he was surprised. To help determine whether a patient with chest pains has had a heart attack, doctors draw blood and measure levels of certain cardiac enzymes. Heart cells release specific enzymes into the bloodstream when they die. The more severe a heart attack, the greater the number of telltale cardiac enzymes in the bloodstream.

But the accident victim's blood work didn't show signs of massive heart-cell death. Her cardiac enzyme levels were only mildly elevated.

Wittstein was even more surprised the next morning when he read her latest EKG tracings. The heart, like any muscle, needs electricity to contract. An EKG records the electrical pattern a patient's heart gives off as it contracts. The accident victim's EKG tracings showed the same distinctive pattern of long intervals and deep inversions as the woman he'd just sent home to Bermuda.

He had now treated two women who hadn't sustained head injuries, but whose EKGs looked as if they had. Each had weak heart muscles, at least initially, but no blocked arteries and little trace in their blood of heart-cell death.

"What's the link?" Wittstein asks. "The link seemed to be the emotional trauma that they had each experienced."

Cardiologists have long believed that acute stress can cause heart attacks. But these didn't appear to be heart attacks.

Wittstein wondered if adrenaline was the common culprit in his two patients' troubles. In times of perceived danger, the body produces adrenaline surges to give people temporarily enhanced powers to fight or flee. Could the extreme emotions the two women experienced — grief in one, terror in the other — have triggered outside adrenaline rushes that somehow temporarily stunned their hearts? Wittstein mentioned his hunch to a young doctor, a fellow in cardiology, who was working with him at the time. "We kind of looked at each other and

said, Yeah, maybe it's possible," he recalls.

A stunned heart might beat normally once the crisis passes and adrenaline levels in the body taper off. Because the heart of the Bermuda woman had apparently begun beating normally during the time it took her to travel to Baltimore, Wittstein decided to give the accident victim daily echocardiograms to see if her heart function also spontaneously improved. This wasn't standard operating procedure. He didn't formally request the tests, and he didn't charge the patient for them. Wittstein and the cardiology fellow just grabbed the equipment and performed the test themselves, bedside, out of curiosity.

By the third day, Wittstein says, the woman's heart was functioning perfectly. He was amazed. In five years as a cardiologist he'd never seen this before; now he'd seen it twice in one week.

Two weeks later, a colleague asked him to consult on another patient with unexplained heart-muscle weakness. The woman had been airlifted to Johns Hopkins from another hospital. She had chest pains, shortness of breath and strange changes on her EKG. Yet the doctors at Hopkins found her coronary arteries clear.

It was late, the woman was stable, and Wittstein arranged to examine her the following day. Before leaving the CCU to see patients elsewhere in the hospital, he glanced down at a table and noticed the woman's EKG report. It looked familiar.

"Just for fun, find out if anything stressful happened to her today," he recalls saying as he walked away.

Forty-five minutes later, the woman's doctor paged him. "I'm coming to you," Wittstein says the doctor told him. "You will not believe what happened to this woman today."

The woman had had a surprise reunion that afternoon with a relative she hadn't seen in more than 20 years, and never expected to see again. "As she's sitting there with him, she's welling up and all these emotions are pouring forward," Wittstein says. "She starts having chest pain, breaks out in a sweat, has trouble breathing."

Listening to the woman's story, Wittstein was moved. But looking at her test results, he was excited: They mirrored

those of the woman from Bermuda and the accident victim.

Scouring medical journals for clues, he found tantalizing hints that he was glimpsing a real phenomenon — not a strange coincidence. Doctors in Japan, for example, had reported instances of profound, yet fleeting, heart malfunction. Hearts of their stricken patients appeared, on echocardiogram, to resemble "takotsubo," the wide-bottomed, narrow-necked fishing pots that Japanese fishermen use to trap octopus. That takotsubo shape certainly sounded like the distinctive echocardiograms Wittstein had just been reviewing.

He also found a 20-year-old article on homicide victims whose deaths were medical mysteries. The victims had been horribly attacked: stabbed, beaten, tortured. Yet pathologists performing their autopsies couldn't find any single blow that would have caused death: no nicked artery, no punctured lung, no bleeding into the spleen. What the pathologists found in each case was a distinctive banded pattern of damage to the heart muscle. The article's authors theorized that extreme adrenaline rushes during traumatic criminal assaults had damaged these people's hearts.

In other words, they were scared to death.

Late one night in the CCU, Wittstein was drinking coffee and talking about his strange series of cases with the doctor on call, Hunter Champion. The lights were dimmed so patients could sleep. The doctors kept their voices low. Champion was just beginning his cardiology training but had been doing sophisticated laboratory research for years. Some of that research involved neurotransmitters called catecholamines, the substances like adrenaline that the body produces to mobilize a rapid response in times of stress.

Champion had his own lab. He and Wittstein decided they would test for catecholamine levels if they ever saw another patient like the woman from Bermuda, the accident victim or the woman who had the surprise reunion.

Three and a half weeks later, Wittstein says, they were still discussing what to test and how when he got a call at home early one morning from a doctor at another

hospital who was transferring a critically ill woman to his care. The woman was brought to Johns Hopkins in an ambulance and taken directly into the heart catheterization lab. Wittstein arrived at the CCU before his new patient. The intern on call handed him the woman's paperwork and said he'd just spoken to the woman's husband. The husband said she'd gotten sick at a party.

"What a terrible thing to happen to someone on their birthday," the intern said.

MARGARET WEBER HAS ALWAYS HATED ATTENTION. The retired bookkeeper from Joppa, Md., has spent her life content in the background. She likes listening to her charismatic husband, Ed, tell jokes and stories. She has never dreamt of telling them herself.

"You wouldn't get me speaking in front of anyone," she says. "Even if I know what I'm talking about, I get embarrassed. I'm active in church, but I won't get up in front of the congregation. I'm too self-conscious."

Margaret has survived a lot in life, she says. She survived her mother dying when she was a toddler. She survived an alcoholic father. She survived her and her siblings being separated and parceled out among relatives and strangers. She survived the early deaths of three siblings.

She built a life of quiet security with a husband who bragged on her cute nose and her mind for math, and two children who gave her grandkids to dote on.

On March 20, 2000, she turned 60 while vacationing in Florida with her husband. Her kids called to tell her they'd celebrate with her when she got home.

A few weeks later, they invited Margaret to Rockfield Manor in Bel Air for what was supposed to be a fundraising event for a friend. Inside the old home, dozens of Margaret's friends, relatives and former co-workers, some of whom she hadn't seen in years, awaited her arrival.

"Surprise!" they yelled as Margaret came through the front door.

Margaret was so confused that it took her several seconds to register that everyone was looking at her. For the next three hours, she says, she tried to talk to everybody who'd been nice enough to come to her party. Her kids had worked so hard to make this special for her. They had a whole table loaded with party food, but Margaret was too excited and nervous to eat.

When it came time to open presents — with everyone smiling at her expectantly —

Margaret felt overwhelmed. "One of the ladies who was there making the list of gifts and who gave them said, 'Marge, settle down, we're all friends here,'" she says.

By the time guests were leaving, Ed told Margaret she didn't look so good.

"I think I'm going to pass out," she recalls saying. She didn't. She threw up. She kept on throwing up after Ed put her in the car and headed for the closest hospital.

Her blood pressure kept dropping. Her heart was barely pumping. By the time she was transferred to Hopkins, about 4 a.m., she was near death. Doctors rushed to get her blood pressure up quickly.

After helping stabilize Margaret and reviewing her test results, Wittstein gave her some encouraging news:

He suspected that the emotional shock of the surprise party had triggered a massive adrenaline rush, which temporarily stunned her heart. "If that's true, then you are going to get better, and you are going to get better pretty quickly," Wittstein says he told her.

Within a few days, the retired bookkeeper's heart was contracting vigorously once again.

Weeks later, Wittstein says, laboratory results came back showing that the adrenaline level in Margaret's blood following her surprise party was about 30 times higher than normal.

Over the next four years, Wittstein, Champion and other doctors at Johns Hopkins repeated the test on several more patients whose heart muscles became weak temporarily after they experienced emotional trauma. Some patients fell sick moments after a trauma. For others it took a few hours. The extreme emotions that triggered their medical emergencies ranged from fear and anger to grief. One woman landed in the CCU after an armed robber put a gun to her head and scared her half to death. Another woman collapsed upon learning of a friend's suicide. An elderly woman, who'd survived agonizing years of her son's mental illness, had chest pains the first time she spoke publicly about her family's travails at a support group. A mother fell ill after she tried to throw her teenage daughter out of the house, the girl refused to go, and their battle raged on until police arrived.

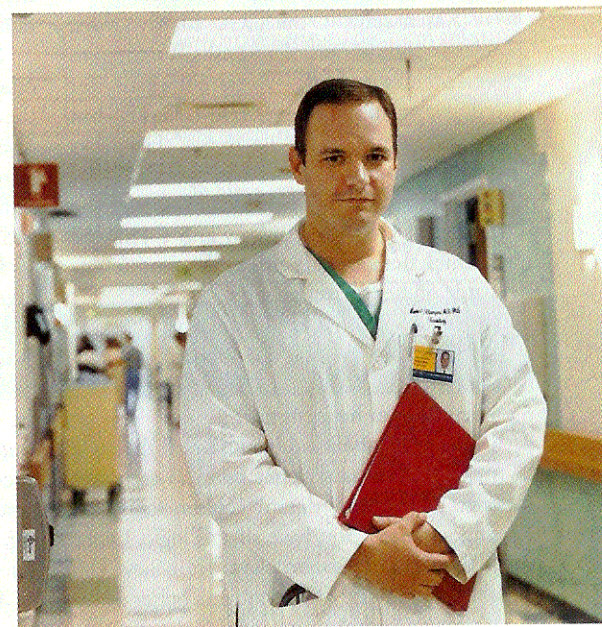
No matter what heartache had landed these people in the coronary care unit, their

test results proved so consistent, and the course of their recovery so predictable, that Wittstein and Champion gave their condition a nickname: "broken heart syndrome."

KAREN SCHILLINGS CAN'T STOP SHIVERING. She's in the emergency room at Johns Hopkins Hospital being treated for hypothermia. Wrapped in a heated cocoon that blows air onto her skin at regular intervals to try to raise her core body temperature, the Girl Scout leader from Illinois has never felt colder.

The chill she feels isn't just the ill effect of being tossed into the frigid harbor. It is dread.

Corinne and Andrew are still missing. Boats and helicopters have searched the harbor for nearly three hours. By 7 p.m., Baltimore Fire Chief William J. Goodwin Jr. announces that it is impossible for anyone to have survived the cold water this long,



Hunter Champion's research involving neurotransmitters was crucial in documenting the syndrome.

and rescue efforts shift to searching for the bodies of the dead.

Denny, keeping vigil by Karen's gurney, is bereft. Karen and the girls have always looked to the 6-foot-2 social studies teacher as their protector. "I can't fix this," Karen recalls Denny telling her numbly. "I can't fix this. I can't fix this."

Karen knows.

Her body temperature is rising. But her broken heart is shutting down. Her heartbeat becomes irregular. Worried that she is having a heart attack, doctors rush her to

"They kept telling me I was going to be okay . . .

That means my body is healed, but does that mean my heart is healed spiritually and emotionally?"

the coronary care unit.

Doctors there perform a series of tests and recognize the classic signs of broken heart syndrome. Within hours they can reassure her that she is very likely not having a heart attack, and her heart muscle will not be permanently damaged. Time, they tell her, will mend her heart.

"They kept telling me I was going to be okay," Karen later recalls. "It was almost like, Yeah, I'm going to be okay, but what does that mean? That means my body is healed, but does that mean my heart is healed spiritually and emotionally? Corinne was lost so quickly, it was just hard to comprehend. How come I'm still alive and she isn't?"

Karen stays in the CCU for five days. Her attending cardiologist asks Wittstein to review her records. Wittstein reads her chart and looks over her test results, but doesn't speak to her, he recalls. He peeks into her room, and sees her watching televised reports on the search to recover the bodies of Corinne, Andrew and 6-year-old Daniel Bentrem. He doesn't want to intrude on her sorrowful vigil.

Karen keeps telling Denny that she can't turn off the TV. She has to watch. Watch and struggle. Struggle to find a way to survive whatever happens next.

"On the one hand, you have all the logic that her soul has left her body," Karen says later. "That body doesn't contain Corinne's soul anymore. You have all this logic. Okay. If they don't find her, okay. We believe she and Andrew and Daniel are in a better place. It's okay. On the other hand, I had a vision of that body in the water, just deteriorating there in the water. If they didn't find her we wouldn't have a chance to say goodbye the way we wanted to. I prayed a lot when I was in the hospital that they would find her body, just so we could have some sense of closure."

BERNARD "BEAN" MULLER CRAWLS ON HIS HANDS AND KNEES IN TOTAL DARKNESS. More than 60 feet beneath the surface of the Northwest Harbor of the Patapsco River, the 46-year-old diver with the Baltimore Fire Department grasps blindly at the silt-covered river bottom. He is hoping to find one of the Lady D's three missing passengers and bring them home.

For six days fire department divers have been braving the frigid depths to search for the bodies of the little boy and the ill-fated lovers.

Tyco Telecommunications has donated a 400-foot ship with sophisticated sonar equipment and a bottom-roving robot to aid their search.

Each dive is perilous, Muller later recalls in an interview. Divers follow an electrical cable from the Tyco ship down to the roving robot on the harbor floor. The cable provides a crucial guide through the gloom. But sometimes it gets tangled with the lines attached to the divers' helmets, which deliver the air they need to breathe from tanks aboard boats on the surface.

Some divers hum or sing as they descend; others talk to the guys on the surface through the communication system built into their dive helmets. In the deep they can't see anything but occasional shadows. Those can be unnerving. So divers find it easier to relax and do their job if they keep their eyes shut.

Repeated dives have resulted in two divers with burst eardrums and yielded only tree stumps, mud mounds and mounting frustration.

On Saturday, March 13, 2004, a week after the Lady D capsized, Muller finally grasps a body in the darkness. It is the rescuers' first success, and he is elated, he recalls: Mission accomplished. He is ascending, hoisting the body toward the surface, when he feels a radical snap in his neck.

The force of the snap flips Muller upside down. A cable has snagged him around the neck. He struggles to free himself but can't. As his helmet fills with water he notifies buddies on the surface he needs help. The inflation device in his 80-pound diving suit has activated and is choking him.

Two fellow divers plunge in and cut Muller free.

As Muller passes out, he drops the body he worked so hard to find. It is Corinne. She floats back down, lost again alone in the gloom, as Muller shoots rapidly toward the surface, feet first, as if he's the Michelin Man filled with helium.

Muller still isn't breathing as fellow firefighters haul him on board a police boat. He's been deprived of oxygen for so many minutes

he's blue. Firefighters puncture his suit to let the air out and work frantically to revive him before rushing him to the hospital.

The next morning, Muller is back at work at the fire station near Fort McHenry. But his close call weighs on his buddies. Capt. Kenneth Hyde, one of the divers who rushed in to cut Muller free, is scheduled to make the first descent of the day. A father of three, Hyde was awake at 3 a.m. worrying about it, he later says in an interview. He was trying to think up technical refinements to make all their dives safer. He was wondering, he recalls, "If I get in trouble, will they be able to reach me in time? I may be crazy, but I don't want to die."

Before heading out, the divers meet with Chief Goodwin on the second floor of the station. He tells them that he's thinking of making the hard choice to call off the search. The meeting breaks up. A few minutes later, the chief rushes back into the room. He's gotten a phone call. Sonar operators have detected what look like two bodies close to the shore about 70 yards from where the Lady D capsized.

At about 2 p.m. Hyde reaches Andrew in 60 feet of water in the Patapsco River. He ties a rope around Andrew's waist and arms, and guides his body to the surface.

A few hours later and more than 100 feet away, diver Phil Bildstein finds Daniel. Bildstein can't see anything in the black water, but feels the tiny form and realizes he's found the missing child, he later says in an interview. Bildstein slips a rope harness around Daniel, and cradles the dead child close to him. Torn between elation that he has found the boy and sorrow that he had to, the firefighter tries not to be overcome by emotion as he lifts Daniel to the surface. Bildstein has children of his own, 3-year-old twins. That night, Bildstein recalls, his wife tells the twins that Daddy has been out in the harbor helping someone who was lost find his way home.

The next day, on their 35th dive over 10 days, rescuers find Corinne again and bring her up.

An emotional Goodwin congratulates his divers on having what it takes to do such a tough job well — for having heart.

Karen Schillings's brother, who has flown to Baltimore to identify his niece's

body, telephones her parents to say that even after all that time in the frigid harbor Corinne looks strangely unchanged. "She's beautiful yet," he says.

Remembering how much Corinne loved Christmas, her parents deck the funeral home with a grove of donated evergreens and Corinne's collection of ornaments.

After her packed funeral at St. Joseph's Catholic Church in Homewood, a suburb south of Chicago, an usher hands Corinne's parents an envelope. The usher explains that a couple, who said they drove all the way from Minnesota for the funeral, left the envelope without leaving their names.

Inside is a striking photograph of Corinne and Andrew. They are at an outdoor wedding. The setting looks both beautiful and mysterious in this black-and-white photo. Corinne, ethereal, smiles gently in the background. Andrew, so close to the photographer, he looks as if he's about to step out of the frame, beams as if he knows a wonderful secret.

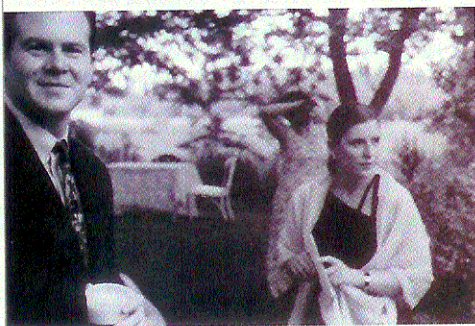
THIS PAST FEBRUARY, JUST BEFORE VALENTINE'S DAY, the New England Journal of Medicine publishes the results of the Johns Hopkins research on broken heart syndrome. Ilan Wittstein and Hunter Champion are the lead authors.

The study — titled "Neurohumoral Features of Myocardial Stunning Due to Sudden Emotional Stress" — concludes that emotional stress can cause severe but reversible dysfunction of the heart muscle that mimics a heart attack. The study is based on 19 patients, including the grieving daughter from Bermuda, the woman terrified by the car accident, the woman who had the surprise reunion with a long-lost relative and Margaret Weber, whose kids threw her the surprise birthday party. About half the patients in the study became ill after receiving news of an unexpected death. Broken heart syndrome is likely common, the authors say, hiding in plain sight, in fact, and routinely mistaken for a heart attack. The precise cause remains unknown, but the syndrome is associated with massive adrenaline rushes, the study finds. The authors note that catecholamine levels of the 19 study patients were seven to 34 times more than normal when they first arrived at the hospital. Women, especially postmenopausal women, are particularly susceptible to broken heart syndrome, although the authors cannot say why.

That same month doctors from Minnesota publish an article in the journal *Circulation* laying out several cases they've witnessed of patients experiencing temporary

weakening of the heart muscle after severe emotional stress.

The practical implications of the research are enormous, Wittstein and Champion say. Doctors who recognize the signs of broken heart syndrome in their own patients — the distinctive weakening of the heart muscle, unusual EKG tracings and low levels of cardiac enzymes, following emotional trauma — may treat them very differently. Instead of prescribing unnecessary blood thinners or even performing unneeded open-heart surgery, they can stabilize the patient and give the heart time to recover on its own. Patients who survive the critical first days can hear that their prognosis for a complete recovery is great.



Andrew and Corinne at a wedding in Minnesota.

"Ilan and I were talking on the day this came out about how there might be a doctor in Botswana or Kiev who has a patient with this, and they didn't know what it was the day before," Champion recalls. "But the day after, because of modern technology getting the word out fast, they'd be able to walk in to their patient and say, 'We know what's going on with you.' That's very exciting."

The questions the research raises are large. Thousands of years after men of science and letters first pondered the power of the human heart, its workings remain mysterious. If adrenaline stuns the heart, how precisely does it do that? What cellular changes does it wreak? What brain pathways are activated during the syndrome? Do some hearts, once stunned, keep breaking?

None of the 19 patients in the Johns Hopkins study has had a recurrence.

But Champion is asked to consult one day in the case of an elderly woman admitted to the hospital with what was diagnosed as a flare-up of chronic emphysema. She was short of breath. Her heart initially beat so weakly, her doctor said she was in heart failure. But then her heart muscle recovered spontaneously.

Reviewing her records, Champion no-

tices that she's been admitted to hospitals three times in three years with what were, to him now, obvious signs of adrenaline surges that had temporarily stunned her heart.

In fact, Champion realizes with a start, the woman has been admitted to the hospital on the very same date each year. "Talking to her daughter, I said, 'Anything stressful going on in her life?'" he recalls afterward. "She said, 'Oh, yes. Every year she gets admitted on the anniversary of Daddy's death.'"

KAREN SCHILLINGS IS IN HER DEN in Homewood one spring day, sorting through old papers.

An envelope flutters to the floor. Karen recognizes the handwriting. It is Corinne's. Grief returns in an instant, and Karen experiences it like a physical blow to her chest. "It was like my heart almost stopped," she says later.

Trembling, Karen opens the envelope. Inside is a note, somehow never mailed, that Corinne wrote years earlier to a college sorority sister. In it, Corinne, ever cheerful and optimistic, jokes about how they are going to have to get out in the world and search for true love.

Karen weeps. "It's just the emotions of knowing we don't have her anymore," she says later. "That part never completely heals."

Andrew's father, Edward Rocella, has his own name for the interplay of loss and memory. "I call it broken life syndrome," he says.

The grieving father has left his son's condo just as it was when Andrew walked out the door the last time: clothes hanging neatly in the closet, shoes lined up just so, eyeglasses on the bathroom vanity. Edward visits once a week to water his son's plants and listen to phone messages from callers who don't realize that Andrew is gone.

More than a year after the Lady D capsize, Edward hasn't returned to his job as a program coordinator at the National Institutes of Health. "Partly, it is just the exhaustion," says Edward, who has a doctorate in public health. "The depression is so strong sometimes you just can't keep awake. Partly, it is thinking about life: What to do?"

Both Andrew's parents and Corinne's have started scholarship funds to help students study language abroad. It helps to keep their children's memories alive.

Some days Edward can't help remembering the March afternoon when they all stepped onto the Lady D, laughing. Some nights he dreams about the accident. "Of

course I wonder, why Andrew and not me?" he says. "I would have traded places with him in a heartbeat."

IF THOUGHTS CAN BREAK HEARTS, SO, TOO, CAN THEY HEAL THEM.

George Bentrem, the Virginia doctor, says that the tragedy in the harbor that ended his 6-year-old son Daniel's life and left daughter Sarah severely brain-damaged has strengthened his family's faith. Sarah, now 9, no longer speaks or makes purposeful movements. Her parents, who care for her at home, read the words of Psalms 34:18 — *The Lord is close to the broken hearted* — and believe.

Karen and Denny like knowing that the evergreens from Corinne's funeral are growing now in parks all over Homewood.

Karen likes to remember how the Catholic priest who visited her every day in the CCU at Johns Hopkins once told her: "Andrew and Corinne had the best wedding possible. God married them in Heaven. They are together for eternity."

She likes to believe that's true.

She likes to recall all the people, strangers as well as friends, who heard of their loss and felt moved to offer consolation.

In the back yard of the house where Corinne grew up, there is a stepping stone local Girl Scouts made in her memory. "If tears could build a stairway, and memories a lane, I'd walk right up to Heaven and bring you home again," it reads.

On a recent Saturday afternoon, Denny stoops to brush a speck of dirt from the stone. He clears his throat and looks away.

The house in Vienna, Va., where Andrew grew up is filled with photographs of him and Corinne. Andrew's father doesn't need the pictures to remember.

Sometimes, he looks out the window and sees the young lovers racing up the driveway in Andrew's Saab convertible. Corinne's long brown hair is pulled through the back of a baseball cap.

The couple rushes in laughing at some private joke. They are sweaty from shooting hoops together. Andrew opens the refrigerator wanting to know if there's anything to eat, and of course there is.

The scene is so vivid in his mind that it makes Andrew's father smile. For a moment, his heart is glad. 10

April Witt is a Magazine staff writer. She and Ilan Wittstein will be fielding questions and comments about this article Tuesday at 1 p.m. at washingtontimes.com/liveonline.