Not Feeling Your Toes—Not a Good Sign

Lt. Matthew Munn

"Cabin altitude."

"Holding, eight K."

How many times has every Prowler aircrew had that conversation? They do it at least once a flight on the climb checks. How often do you check pressure after the aircraft passes through 10,000 feet MSL? My experience with the pressurization system has convinced me the answer needs to be, "More often."

The flight occurred on my NATOPS check in the FRS. We started climbing to altitude, heading across the Olympic Peninsula to hit the entry point for a low-level. As we climbed west, Seattle Center held us at 16,000 feet. Everything settled down, and we took our oxygen masks off, even though NATOPS forbids it. After we'd been there about two or three minutes, I was feeling light-headed. During the past few days I had flown my front-seat and back-seat NATOPS simulators, and had taken my NATOPS closed-book exam. I thought I was just tired. Then, from the back seat, I heard, "Check cabin altitude." I leaned over to check the gauge: 16,000 feet.

The pilot responded, "Check the cabin dump." The switch apparently had not been seated correctly, but when I reached down, it slid into position. Anyone who has conducted an FCF can picture what happened next. The cabin pressure went from 16,000 feet to 8,000 feet in about 10 to15 seconds. During that time, everyone's primary focus was trying to keep up with the changing pressure, not flying the aircraft.

ECMO 2 reported a partial sinus block. After the pressure stabilized, she said it wasn't too bad, and we could continue onto the route. As we descended to 1,500 feet MSL, it became obvious the sinus block was bad; she couldn't clear anything and was in pain.

We found ourselves over the Pacific Ocean at 4,000 feet, unable to climb above the 8,000-foot Olympic Mountains that separated us from home. We would need to go all the way around the Olympic Peninsula to avoid making the backseater's sinus block worse. The flight had just begun, so gas was not a problem. We started to coordinate with Seattle Center to get clearances. We let them know we had a "physiological episode," couldn't proceed over the mountains, and required routing around the Olympic Mountains. We rarely fly along the northern edge of the Olympic Peninsula because of its proximity to Canadian airspace and lack of suitable navaids.

The controller read our clearance routing and, though I didn't recognize a navaid, I accepted it. Much to my chagrin, none of the others in the crew recognized it. It took about two minutes to find it: an NDB on the low chart. It wasn't an issue because, as soon as we turned east, we were cleared direct to Whidbey. The rest of the flight, except for the extremely gentle let-down, was normal.

What had caused the cabin-pressure problem? Both the pilot and ECMO 1 had checked the cabin dump switch on pre-flight. We had checked the cabin altitude on the climb, and it was normal. We determined that although the cabin altitude was checked, we had done it passing 9,000 feet MSL. The cabin-pressure gauge, which normally fluctuates anywhere between 7,500 feet and 8,500 feet even without parallax being added in, appeared to be at 8,000 feet. If we had waited a few thousand feet, or

checked the gauge again, we would have caught the problem before it became serious.

Everyone had felt the initial effects of hypoxia, but nobody recognized the problem. Not until ECMO 3 lost feeling in his toes did he think to look at the cabin-altitude gauge. What if no one had caught the pressurization problem? We could be dead. What if we had been low on fuel and hadn't been able to take our circuitous route home at low altitude, with the nearest divert just as far away as home? We would have had to declare an emergency, climb, risk further injury to our squadronmate, and end up with a lot to explain once on deck. What if the confusion on our clearance from Seattle Center had become an issue? Flight violations, especially on NATOPS checks, are not normally smiled upon.

Three lessons. First, just because a switch looks right doesn't mean it is right. Touch all switches to ensure they are where they should be. Second, there is a reason NATOPS says not to take off your mask. If you must take it off briefly, double-check cabin altitude. More than 10,000 feet means oxygen on. Finally, every switch in the airplane is important, no matter how innocuous it may seem. For me, the cabin dump switch was something we checked on pre-start and didn't think about again. The switch does not appear again in normal checks and is in only one boldface EP ("Smoke and fumes/AC full hot").

Almost anything unchecked can cause problems. Since that flight, I have tried to envision the mishap report. Maybe they would have hypothesized it had been a pressurization problem. The end result still would have been the same: a perfectly good airplane flown into the water.

Lt. Munn is an ECMO in VAQ-136.

Note: *The aircrew involved in this "rapid recompression" incident were concerned that if they climbed, the stricken ECMO's symptoms would worsen. This concern was unfounded. In fact, they might have been able to resolve the situation by returning to altitude.*

Sinus blocks occur because of problems in the passage from the sinus to the nose, usually from upper respiratory inflammation caused by colds or allergies. The symptoms almost always occur when the aircraft is descending. When the aircraft ascends, the sinus develops a positive pressure (relative to the outside environment); gases easily escape to equalize pressure, in spite of narrowed openings in the sinus. On descent, the sinuses develop a negative pressure, and the openings from the sinuses are easily "sucked" shut. Here is where valsalva comes into play; it pushes air through the closed opening and eliminates the "vacuum." If the pressure difference is too great, valsalva can't overcome the obstruction of the sinus opening, and you can't equalize the pressure. If you continue to descend with a blocked sinus, the relative vacuum in the bony cavity of the sinus begins to suck in serum and blood, sometimes ripping the mucus membranes from the cavity walls. The pain is extreme, and resulting infections are common.

Once a sinus blocks starts, a good way to keep it from getting worse is to return to higher altitude and start to valsalva. There should be no relative vacuum, and you should be able to pressurize the sinus. Then start a slow descent, performing frequent valsalva maneuvers to prevent further obstruction. — Cdr. Nick Webster, aeromedical analyst, Naval Safety Center