Figure 1. Radiograph of 48-year-old man with squamous cell carcinoma of left lung, penetrating pericardium.

Figure 2. Patient in Figure 1 after pneumonectomy and pericardiectomy. Although area of penetration was small, most pericardium was resected, avoiding herniation.

the pericardium, I prefer not to close the pericardium at all but rather to do a near-total pericardiectomy. Figure 1 shows a radiograph of a 48-year-old man with squamous cell carcinoma of the left lung, penetrating the pericardium. Figure 2 shows the same patient after pneumonectomy and pericardiectomy. Although the area of penetration was small, most of the pericardium was resected, thus avoiding herniation. During the past 22 years (1980-2001), my associates and I have performed 14 such

operations at the Wolfson Medical Center, with no undue effects.

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doi:10.1067/mtc.2003.272

Reply to the Editor:

Thank you for the opportunity to comment on Weissberg's letter concerning our article. The technique of leaving the pericardium open, enlarging the defect if it is small, is a described option after intrapericardial left pneumonectomy.¹ In fact, on the left side, differently than on the right side, the life-threatening complication is not the herniation of the heart but rather its strangulation through a small pericardial hole. Unfortunately, we have no personal experience to comment on this technique, because we always close any pericardial defect on both the right and left sides, as suggested by other authors.² However, we are a little concerned that "near-total pericardiectomy," as suggested by Weissberg, may cause any injury to the phrenic nerve, the function of which is also important after a pneumonectomy.¹

"To be or not to be," said Hamlet. "That is the question," he continued. "To Close or Not to Close," Weissberg entitled his letter. "This is not a question," we would continue—if you are on the left side and enlarge the defect with regard to the phrenic nerve.

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doi:10.1067/mtc.2003.273

Which cell dose supports motor neurons' survival?

To the Editor:

We read with interest the article by Perdrizet and associates¹ titled "Preoperative stress conditioning prevents paralysis after

experimental aortic surgery: increased heat shock protein content is associated with ischemic tolerance of the spinal cord." It is already known that induction of heat shock proteins (HSPs) by whole body hyperthermia can reduce ischemia reperfusion injury,² and we agree that hyperthermic pretreatment could induce tolerance against a severe spinal cord ischemic insult. However, we have one question. It has not been demonstrated that HSP72 is induced in motor neurons or glial cells. Manzerra and Brown³ demonstrated that the heat shock response occurred in glial cells, not in motor neurons, of rabbits after administration of a hyperthermia-inducing drug. On the other hand, Xia and coworkers⁴ demonstrated that whole-body hyperthermia induced HSP72 in motor neurons of the rat spinal cord. It is possible to speculate that glial cells may be a preferential target for the hyperthermia-inducing drug, or there may be differences in stress responses between rabbit and rat spinal cord. However, our previous reports have demonstrated that preconditioning with 10 minutes of ischemia enhanced and prolonged the HSP72 gene expression and protein levels in motor neurons, sparing the neuronal cells from the subsequent lethal ischemia.⁵ Our result revealed that HSP72 messenger RNA and protein were induced as a "molecular chaperon" in motor neurons after ischemia. Therefore authors should demonstrate temporal profiles of HSP72 in histochemical study or in situ hybridization study.

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A gauze sponge cannot act as a gas diffuser in cardiac surgery when it gets wet

To the Editor:

In an effort to improve deairing in cardiac surgery, Martens and colleagues¹ used a gauze sponge to reduce the outflow velocity of carbon dioxide delivered from a thin, open-ended tube. The proposed method is no doubt both simple and inexpensive. Their study included patients operated on through a complete median sternotomy or through a right anterolateral minithoracotomy (7-cm skin incision). Gauze sponges were used in combination with carbon dioxide insufflation through a standard perfusion line or a Veress needle. In the standard cardi thoracic wound cavity, they at best reached a mean carbon dioxide content of 52% (range 10%-85 %) with the open-ended perfusion line and of 81% (range 35%-100%) with the gauze sponge added. In the minithoracotomy the mean carbon dioxide content at best reached 97% (range 95%-100%) when applied with a Veress needle together with the gauze sponge.

Apparently, the gauze sponge improved the carbon dioxide deairing substantially, especially in the minimally invasive wound. In the standard chest wound the carbon dioxide content was lower and had a much wider range. The lower carbon dioxide levels in the standard chest wound may have been due to a greater diffusion rate between carbon dioxide and ambient air. The wound opening was wider, and according to Fick's law of diffusion, the diffusion flux is proportional to the area through which the diffusion occurs. Because of the smaller dimensions of the minimally invasive wound, the distance be-

tween the carbon dioxide sampling device and the carbon dioxide supply may also have been smaller, which could have influenced the readings. However, these distances are not reported in the study. The use of rough suction impairs carbon dioxide deairing,² because its effect of 20 to 25 L/min is several times greater than the inflow of carbon dioxide. Because the time and duration of the carbon dioxide measurements were not presented, however, and the conditions regarding suction thus may have varied, these influences cannot be evaluated.

There is another and more important possible explanation for the wide range and lower means of the carbon dioxide levels measured in the standard open chest wound. Because of their hydrophilic properties, gauze sponges are used to absorb fluids. When a gauze sponge gets wet, as it easily does in the cardiothoracic wound, its structure collapses, and it loses its function as a diffuser. In a not yet published study, we have shown that a diffuser must be positioned inside the wound cavity, several centimeters below the wound edge, to provide a high degree of deairing. In contrast, carbon dioxide delivered above the wound opening and falling down by gravity into the wound will rapidly become diluted with ambient air through diffusion. Thus the gauze sponge may be exposed to blood and other liquids during surgery.

After having read Martens and colleagues' report,¹ we tested a gauze sponge for carbon dioxide deairing of a cardiothoracic wound model positioned in a fully ventilated operating theater. Suction was not used. A dry gauze sponge (in front of a small tube), positioned near the diaphragm, provided a mean carbon dioxide content of 97.5%, as measured at the topmost part of the right atrium (8 cm from the gauze sponge). When the gauze sponge was wetted with water, however, the measured mean carbon dioxide content immediately decreased to 30%, at which level it remained. We have designed a gas diffuser,² which may solve this problem. It is a thin tube (2.5 mm inner diameter) with a diffuser at the end. The diffuser is a small piece (18 × 14 mm) of soft polyurethane plastic foam with open cells. We tested the gas diffuser along with the gauze sponge. The gas diffuser, positioned as the gauze sponge, produced carbon dioxide contents greater than 99.5% not only when dry but