Specific indications for the operation were as follows:

1. Presence of thymoma (n = 20) or suspected thymic mass (n = 3) on the thoracic computed tomographic or nuclear magnetic resonance scan
2. High titers of acetylcholine receptor antibody (n = 3)
3. Resistance to pyridostigmine therapy or relapse after steroid or immunosuppressive therapy (n = 1)
4. Dependence on a high dosage of corticosteroids (n = 2).

Our mortality rate was nil, and no major morbidity was experienced. That is common to most of the surgical teams skilled in the treatment of myasthenic patients and makes the thymectomy a generally considered safe procedure.

The neurologic results of thymectomy in our overall series of 45 patients with OMG have been recently reported.⁶ The remission rate was significantly higher in patients with stage I myasthenia than in those in the other Osserman categories.

In the more recent series of 29 patients, the neurologic postoperative results were 22 complete remissions, 3 remissions with medication, 3 cases of improved status, and 1 case of unchanged status.

Our experience, general considerations, and results suggest that extended thymectomy might play a role in highly selected patients with OMG, and there is need for further studies to assess its efficacy.

We again congratulate the authors, who have focused and debated on what is considered a highly controversial indication for thymectomy.

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doi:10.1067/mtc.2003.253

Reply to the Editor:

We appreciate the comments by Lucchi and colleagues at the University of Pisa. Their results are consistent with ours, but they differ in one important respect. In their group of 29 patients, 23 were operated on because of thymomas or suspected thymic masses, and 3 had thymectomies because nonoperative therapy had been ineffective or was not tolerated. This suggests that only 3 of their 29 patients had thymectomies specifically for the treatment of ocular myasthenia gravis (OMG), whereas OMG was the indication for operation in all of our patients. Our findings, supported by those of Lucchi and associates and the University of Pennsylvania group,¹ strongly suggest that thymectomy achieves greater remission rates for OMG than for more advanced forms of myasthenia gravis. Thus we recommend operation as the primary treatment for OMG when the diagnosis is firm.

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doi:10.1067/mtc.2003.254

Percutaneous valve insertion: A new approach?

To the Editor:

The recently published article on percutaneous aortic valve replacement Lutter and associates¹ strengthens our belief that non-surgical valve replacement will soon become a reality in the replacement of semilunar cardiac valves.

Andersen, Knudsen, and Hasenkam² reported a nonsurgical heart valve replacement as early as 1992, and this was followed by similar attempts by other groups. Many technical problems have been encountered. The size of the vascular access required was too big, the function of the valve after compression and re-expansion could be compromised, and finally the newly implanted valve could obstruct the coronary orifices in aortic implantations. We reported our first experimental studies in 2000 for percutaneous pulmonary valve replacement and, after ethical approval, the first human heart valve implantation was performed by us in September 2000.^{3,4} In parallel, we reported our first successful aortic implantations in an experimental setup without creating coronary obstruction due to a newly designed stent with a two-step deployment strategy.⁵ In April 2002, the French newspapers reported the first successful percutaneous implantation of an aortic valve as an emergency procedure in a 47-year-old man in cardiogenic shock. This came as a result of an ongoing research project by Alain Cribier in Rouen, France.

The article by Lutter and associates reports their experience with aortic implantations. As in our early aortic work, they have experimented with valve implantations in the supracoarotary position. In this position, the valve implant does not obstruct the coronary orifices and the pressure difference over the closed valve is significantly smaller. This decreases the force to dislodge the valve after implantation and leads to reduced stress on the functioning valve leaflets. In our experience, implantation in this position was technically easy. However, in contrast to Lutter and coworkers, we had significant problems with cor-

onary perfusion.⁶ This was not unexpected, because implantation in the supracoronary position reduced the diastolic coronary flow volume. All of our animals that had this procedure died within 24 hours of implantation. The experiments performed by Lutter and colleagues experiments were ended at an earlier stage, and we would express concern as to the midterm feasibility of this type of implantation. Lutter's group also reported success of implantation in a low subcoronary position in 2 animals. Implantation in this position is physiologically clearly preferable but technically much more demanding. Further, the requirements of durability and stability of the valve are higher. Low subcoronary implantation in our experience led to paravalvular leaks and mitral valve injury. The orientation mechanism, with the two-step implantation technique developed by us, solved this problem and is one way to avoid coronary obstruction during valve implantation. Using this technique, we were able to implant aortic valves in the annular position in 5 consecutive lambs in 2001.

The increased interest in the field of percutaneous valve implantation and ongoing research will lead to safer and more effective valve replacements avoiding conventional surgery.

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doi:10.1067/mtc.2003.280

Reply to the Editor:

We thank Boudjemline and Bonhoeffer for their valuable comments on our study.¹ As we know from our initial experimental work^{1,2} started in 1996 using an infrarenal approach, it is very difficult to position a valved stent directly into the aortic annulus without previously removing the native porcine leaflets. Native leaflets are very flexible and large enough to occlude their coronary ostia while the valved stent or a single stent is being deployed in pigs. As Andersen and colleagues³ demonstrated in 1992, the implantation of a valved stent into the annular position is impossible in a porcine model because of the restriction of coronary blood flow. Therefore, in a series of 14 animals we evaluated the aortic valved stent in the descending aorta and in the subcoronary and supracoronary positions.¹ Eleven of them were successfully implanted (descending, n = 6; supracoronary, n = 3; subcoronary, n = 2) and demonstrated low transvalvular gradients with good angiographic and echocardiographic results.

Boudjemline and Bonhoeffer's approach is very appealing, as it accurately implants the valved stent transannular without occluding the coronary ostia by any of the new commissures of the valved stent or native ovine leaflets. In a series of 12 lambs, they successfully transluminally implanted an optimally functioning valved stent in 4 animals of the descending aorta group and in 1 animal of the orthotopic group via a carotid approach.⁴ Whether such a method is also implementable in porcine aortic annuli due to its deployment strategy is still unknown, because different species may have different distances between their

coronary arteries and leaflets. Furthermore, a 2-step deployment strategy⁴ is more demanding from the infrarenal approach that we used^{1,2} than from a carotid approach.⁴ Changes in hemodynamic parameters and in the coronary blood flow after supracoronary valved stent implantation should be considered in future studies. This has not been carried out by previous studies either, unfortunately.^{3,4} Because we performed only short-term studies, the long-term durability of this kind of aortic valved stent remains unclear.¹

Percutaneous implantation is one of several advancements toward ideal percutaneous aortic valve replacement, that is, in human beings with a calcified stenotic aortic valve.¹ The development of various techniques for implementing this replacement should also be considered.^{1,2} Percutaneous aortic valve ablation techniques² for aortic stenosis, a stable scaffold enabling those intra-aortic procedures, filters avoiding systemic embolization, and circulatory support during percutaneous aortic valve ablation and implantation using femoro-femoral bypass and left ventricular venting should be developed.

Deployment lasted about 2 minutes in our short-term study. At any rate, a longer operating time (>3 minutes) in the ascending aorta is necessary for percutaneous aortic valve ablation and implantation, and one would expect resulting hemodynamic instability. More complex procedures on the native aortic valve using ablation techniques² should be performed with circulatory support.¹ Such approaches would open the door to new perfusion and microsurgical techniques. After aortic valve ablation, one has no bothersome calcified leaflets to deal with between the stent and coronary arteries, therefore reducing paravalvular leaks and valved stent migration.

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doi:10.1067/mtc.2003.281

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