tion testing procedures relies upon a basic adequacy of the respiratory muscle pump itself. Abnormalities in test results then reflect the extent of disease of the lung or airways. However, when there is inadequacy of respiratory muscle function, one would not expect most pulmonary function test results to clearly indicate the extent or progression of the state of respiratory muscle function. In such conditions, the most appropriate index of the need for mechanical assistance to ventilation is the clinical symptomatology, as used in the report of Sivak et al.[1]

One particular physiological problem that may arise with respiratory muscle formation is illustrated by patients 23 and 24, namely the occurrence of diaphragmatic paralysis following multiple intrathoracic surgical procedures. In such cases, fibrous tissue may obscure the phrenic nerves, which may then be severed during the surgical procedure. Indeed, inadvertent severing of one or both phrenic nerves may occur during any thoracic surgical procedure, especially in small children, and should always be considered when a patient with otherwise normal lungs presents extraordinary difficulties in weaning from mechanical ventilation during the immediate postoperative period. It is especially important to recognize this complication early in the postoperative period, as prompt surgical reconnection of the severed nerve will restore diaphragm function completely. The physiological and clinical manifestations of diaphragmatic paralysis are reviewed by Loh et al.[4]

In conclusion, it appears that technological developments for providing mechanical ventilatory assistance are now at a sufficiently advanced state that the provision of such therapy is entirely appropriate in the patient's home. Patients with neuromuscular or musculoskeletal disease may often benefit substantially from such therapy and may thereby be permitted to live with a significantly improved quality of life, avoiding many of the prolonged hospital stays they might otherwise be subjected to. Knowledgeable physicians, nurses, and home care therapists can satisfy a true social obligation to such patients by thoughtfully evaluating and, when appropriate, instituting therapy with home care ventilatory support.

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References

1. Sivak ED, Cordasco EM, Gipson WT, Stelmak K. Clinical considerations in the implementation of home care ventilation; observations in 24 patients. Cleve Clin Q 1983; **50:**219–225.
2. Gibson GJ, Clark E, Pride NB. Static transdiaphragmatic pressures in normal subjects and in patients with chronic hyperinflation. Am Rev Respir Dis 1981; **124:**685–689.
3. Tsanaclis A, Grassino A. Diaphragm and intercostal muscle behavior in ankylosing spondylitis during CO_2 rebreathing. Am Rev Respir Dis 1979; **119:**366.
4. Loh L, Goldman M, Davis JN. The assessment of diaphragm function. Medicine 1977; **56:**165–169.

Influence of HLA, A, B, and DR antigen matching in transfused cadaver renal transplant patients

The two most important histocompatibility systems in man are the ABO blood group and the HLA complex.[1] The rules governing transplantation with regard to the ABO system are the same as those for blood transfusion (the donor must be compatible with the recipient). In most instances, transplants performed across the ABO barrier will result in immediate graft failure. HLA antigen inheritance (of Class I HLA A, B, and C and Class II HLA D/DR antigens) obeys basic genetic principles when the antigens are codominant. Therefore, siblings can be (1) HLA-identical and have a 90% one-year graft survival; (2) half or haploidentical and have a 60% to 70% one-year graft survival; and (3) share no HLA antigens and have a 45% to 50% one-year graft survival. Matching of Class I and II HLA antigens is of unquestioned importance to the survival of renal allografts from living-related donors; its predictive value in cadaveric transplantation has been the subject of much debate during the past decade.

Ideally, as many Class I and II HLA loci should be matched (to avoid incompatibilities) in order to obtain maximum graft survival. Because of the extreme polymorphism of the HLA antigens, this may be difficult to accomplish. To increase the chances of obtaining well-matched donor-recipient pairs, regional and national organ-matching and distribution services have been set up to pool the prospective recipients from one region into a single group.

Historically, the relevance of matching for the Class I HLA A and B antigens has been questionable. In 1968, sequential analyses of North American data from P. I. Terasaki's laboratory initially

showed a correlation between the degree of matching and graft survival. However, their subsequent data in the mid-1970s failed to confirm this. Finally, their recent analyses in 1980 once again began to show a correlation.[2] Data from the London Transplant Group show that improved graft survival could be better achieved by matching for HLA B rather than HLA A locus antigens.[3] Matching for HLA A and B antigens probably improves cadaveric renal allograft survival, particularly if the donor and recipient are matched for both A and B antigens.

Transplant center differences regarding the relevance of HLA A and B matching to graft survival are predicated in part on the idea that there are only two important HLA loci (HLA A and B) to consider in transplantation. The HLA D locus, which encodes for antigens responsible for stimulating the proliferative response of T cells in the mixed lymphocyte reaction (MLR), has been shown to correlate with both related and cadaveric graft survival.[2,3] Moreover, matching for the serologically identified D-related locus (HLA-DR) detectable on B lymphocytes is also associated with successful renal transplantation. This finding has created enormous interest in transplant laboratories since (1) the DR system is less polymorphic than the HLA A and B system, and (2) most DR antigens have a relatively high phenotypic frequency. There is a much greater likelihood of finding DR-matched than A, B matched grafts.

Most data cited above on the influence of HLA A, B, and DR matching on cadaveric graft survival were obtained from multicenter studies. However, when studying the influence of HLA matching on graft survival and clinical course, it is difficult to use collective data from various centers because criteria for diagnosis of rejection, therapeutic schemes, and results, such as graft survival, differ widely between centers. Therefore, single center reports are indispensable. Just such a report appears in this issue of the *Quarterly* by Rybka et al (page 227). In a series of 56 cadaveric renal transplants, the one-year graft survival was 78%. All patients had had multiple transfusions prior to transplantation, and maintenance immunosuppression included Imuran, prednisone and Minnesota antilymphoblast globulin (ALG). One could expect the graft survival rate to be explained by the recognized influence of preoperative blood transfusions and the use of ALG postoperatively. However, the investigators report the additive effect of HLA A, B, and DR matching on significantly improved renal allograft survival. Matching for either HLA A, B, or DR alone did not show differences in graft outcome, whereas combined matching yielded improved survival.

The data reported by these investigators lend credence to the role of major histocompatibility complex (MHC) antigen matching in cadaveric renal transplantation. However, multiple center reports of significantly improved cadaveric renal graft survival with the use of the new immunosuppressant cyclosporine begs the question as to whether MHC matching with this drug will continue to be relevant.[4,5]

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References

1. Carpenter CB. HLA and renal transplantation. New Engl J Med 1980; **302**:860–862.
2. Terasaki PI. Histocompatibility Testing 1980. UCLA Tissue Typing Laboratory, Los Angeles, CA.
3. Ting A. The influence of HLA-DR matching on allograft survival in man. Heart Transplantation 1983; **2**:136–142.
4. European Multicentre Trial. Cyclosporin A as sole immunosuppressive agent in recipients of kidney allografts from cadaver donors. Lancet 1982; **2**:57–60.
5. Kerman RH, Flechner S, Van Buren CT, Payne W, Kahan BD. Cyclosporine improves allograft survival in immunologically high-risk renal allograft recipients. Transplant Proc 1983 (in press).