were unrevealing. His initial HIV antibody test by enzyme-linked immunosorbent assay (ELISA) was negative.

A diagnosis of primary HIV infection depends on the detection of specific viral products or seroconversion. One method is an assay for the p24 antigen, a core protein of HIV-1. In the first few weeks after infection, there is an initial burst of virus replication with high serum levels of p24 antigen and plasma viremia. An HIV antibody response, however, may occur as early as 3 weeks or as late as 42 months after exposure to the virus. Screening for the HIV antibody is usually done using the ELISA test. In most laboratories, the more specific Western blot test will be done only to confirm a positive ELISA test but, in fact, the Western blot test may be positive days to weeks earlier. In patients with symptoms suggestive of acute HIV infection, it is important not to rely solely on the ELISA but to also request the Western blot and p24 antigen assay. In the case noted, when the patient was first seen, the initial Western blot result was indeterminate and the p24 antigen test was negative. The p24 antigen and Western blot tests were positive nine days later, but the ELISA test for HIV-1 antibody continued to be negative for four more days. Viral culture and the use of the polymerase chain reaction to detect HIV DNA sequences can also be diagnostic, but these tests are neither cost effective nor readily available. If an acute illness consistent with primary HIV infection remains undiagnosed, it is important to repeat the serologic tests to detect late seroconversion. Depending on the individual case, it would be reasonable to repeat the Western blot and p24 antigen assays weekly during the acute illness and monthly thereafter if the illness remains undiagnosed.

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Pressure Support Mechanical Ventilation

PRESSURE SUPPORT mechanical ventilation, first introduced ten years ago, is widely used and is now incorporated into most late-model ventilators, such as the Puritan-Bennett 7200 and the Siemens Servo 900C.

Pressure support assists spontaneous breaths initiated by patients on mechanical ventilators by maintaining a constant preset airway pressure throughout the breaths. Because the constant pressure is maintained only until inspiration stops, the patient determines both tidal volume and respiratory rate. Flow is initially high to reach the preset pressure rapidly, but it then slows continuously. In contrast, conventional assisted breathing maintains a constant inspiratory flow until a preset volume is reached; pressure increases continuously throughout the breath.

"Low-level" pressure support, with preset pressures of 4 to 8 cm of water, does the work necessary to overcome resistances of the endotracheal tube and ventilator circuit, decreasing the patient's work to approximate breathing without them. "High-level" pressure support, using preset pressures of more than 10 to 15 cm of water, decreases a patient's work further; pressures as high as 20 cm of water may be necessary to prevent fatigue.

Pressure support has many advantages over conventional assisted ventilation. It automatically limits peak airway pressures to a safe level. At any assist mode, pressure support decreases inspiratory muscle work and oxygen consumption by "pushing" gas into the lungs, decreasing a patient's need to "pull" gas in. The magnitude of this effect on work is dependent on the preset pressure level, which determines the ventilator flow rate and the ventilator's "push." Because a built-in microprocessor slows the flow rate progressively as alveolar pressure rises, there is better filling of poorly communicating portions of the lung. This improves ventilation-perfusion mismatch and oxygenation and increases lung distensibility and tidal volume. Because peak airway pressures are lower, cardiac output decreases less than with conventional assisted ventilation. For these reasons, and possibly because patients set their own breathing pattern, pressure support often provides greater patient comfort and thereby requires less sedation than either unassisted breaths or conventional assisted breaths. Finally, because the inspiratory muscles continue to do some work throughout inspiration, pressure support can provide graded muscle training during weaning trials.

Disadvantages include a need for more careful monitoring because minute ventilation may change if either lung resistance or compliance changes spontaneously; a lack of backup, unless used with intermittent mandatory ventilation; the failure of a breath to turn off if there is a leak in the system; and the need to provide additional pressure equal to the patient's positive end-expiratory pressure. Because the patient must trigger the ventilator, pressure support cannot be used to correct respiratory depression from drugs or to manage neuromuscular respiratory failure caused by muscle disease or disuse atrophy or fatigue.

It is desirable to assist spontaneous breathing with low-level pressure support when using intermittent mandatory ventilation or synchronized intermittent mandatory ventilation, because high inspiratory muscle work, oxygen consumption, and fatigue during spontaneous breaths may disastrously exceed even those during spontaneous breathing without a ventilator. Pressure support may also substitute for T-tube trials during weaning, possibly better simulating conditions following extubation.

Pressure support pressures not high enough to prevent fatigue are associated with palpable contraction of the sternocleidomastoid muscles; the pressure support should be increased until they are no longer palpable. Definitive information on whether pressure support is preferable to other methods for weaning is not yet available; anecdotal and physiologic evidence suggests that it is. Extubation is usually possible when a patient tolerates support of 4 to 8 cm of water, the pressure required to overcome equipment resistance.

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