

Foregoing Life Support in Medically Futile Patients

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Abstract

Advances in medical technology have rendered the ability to provide prolonged physiologic support of incurable or terminally ill patients commonplace in the intensive care unit. In tandem, there has been a global shift in the intensivist's mindset from solely pursuing an unrelenting course of aggressive therapy, to a recognition of the limitations of intensive care and the appropriate discontinuance of non-beneficial therapy. Underpinning this shift remains the physician's adherence to the ethical principles of beneficence, nonmaleficence, and disclosure; the patient's right to autonomy and self determination; and the community's right to just distribution of medical resources. When the doctor assumes the role of patient advocate, and assesses illness severity and evaluate recovery, or lack of, to a quality consistent with the patient's own life philosophy, he is able to communicate to the family a course of action that is in the patient's best interest. A consensus on withholding or withdrawal of care is often then achieved. The process of foregoing or withdrawing life-sustaining therapy itself, must be carried out with sensitivity and empathy, with the primary goal of providing comfort and reducing suffering.

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Introduction

The origins of withholding medical support are found in ancient times. More than two millennia ago, Hippocrates (460 to 361 BC) stated that the role of medicine was "to do away with the suffering of the sick, to lessen the violence of their diseases, and to refuse to treat those who are overmastered by their diseases, realising that in such cases, medicine is powerless."

The availability of intensive care units (ICUs) and organ support systems, specifically, renal, respiratory, and cardiac functions, render prolonged physiologic stability a reality. Given the sometimes limited benefits, particularly when frequently associated with significant discomfort, offered by advanced technology and even basic resuscitative efforts, there have been increasing discussions of the circumstances under which medical treatment should be limited or even terminated. Brain death represents a clear physiologic end-point in the ICU wherein the withdrawal of other organ support systems are without dispute medically.¹ Nonetheless, the lack of a legal or cultural acceptance of brain death in some societies, notably the Japanese, renders even this process controversial.

Foregoing life-sustaining therapy (FLST) at the end-of-life remains an area of difficulty, not merely for patients but also for physicians who are untrained in ethical decision-making in medicine. This review is intended to examine its ethical basis and conduct, gleaned from contemporary practices, attitudes and mores in the current literature.

Definitions

Definition of therapy is the cornerstone for defining and resolving medical issues in intensive care (Table I). Therapy is defined as those interventions which can be reasonably expected to benefit the patient.⁵

There is no "gold standard" or formal consensus for defining medical futility. Many believe three criteria need to be met to establish medical futility.⁶ First, the disease must be terminal. Second, the disease must be irreversible. Third, death must be imminent. Most would agree that imminent death means a period of days to weeks.

Another empiric definition has been proposed by some physicians that if, in the last 100 cases, a medical treatment has been useless, the treatment should be

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TABLE I: TERMINOLOGY USED IN MANAGING DEATHS IN TERMINALLY ILL PATIENTS

Foregoing life support therapy

The terms "withholding of life support" and "withdrawal of life support" refer to the processes according to which various medical interventions either are not given to, or are removed from patients with the expectation that they will die as a result.²

Do-not-resuscitate (DNR)

Continuation of medical treatment to the point of an acute cardiac or respiratory arrest, followed by the deliberate omission of attempts at cardiopulmonary resuscitation (CPR).^{2,3}

Euthanasia

Origin from the Greek which means "an easy death." Euthanasia can be defined as active or passive, voluntary or involuntary, by commission or omission, Euthanasia is the direct act of putting to death without pain, e.g. lethal intravenous dose of potassium chloride, to a person suffering from an incurable and painful disease or condition.⁷

Assisted suicide

Refers to the practice of helping a person to take his or her own life but not of directly performing the action that causes death.⁴ An example would be the placement of an intravenous catheter into a patient, supplying the lethal medication, and instructing the patient in how to use it to commit suicide. Although assisted suicide is not equivalent to euthanasia per se, the two terms are often considered together because of the intention and active induction of death as their goals.

regarded as futile.⁷ This conclusion may be reached either through personal experience, experiences shared with colleagues, or consideration of published empiric data. Others have suggested another method for considering treatment futile, i.e. when survival rates vary from a lower limit of 2% to an upper limit of 7%.⁸

The American Thoracic Society (ATS) guidelines define a life-sustaining intervention as futile if reasoning and experience indicate that it would be highly unlikely to result in meaningful survival for the patient.⁹ Meaningful survival refers to the quality and duration of life that would have value to that individual. If a treatment merely preserves permanent unconsciousness (i.e. completely lacking cognitive and sentient capacity), prolongs dying or cannot end dependence on intensive medical care, the treatment may be generally regarded as having no value for such a patient.^{7,10}

We are not aware of any attempt locally to achieve a consensus on the definition of futility. Nonetheless, many of the definitions cited above have universal applications, and they also apply in the local context to varying degrees.

Patterns of Practice of FLST Worldwide

There is evidence for an evolution in medical practice towards a more active role in managing the deaths of the most critically ill. In a retrospective review² published in 1990, 51% of deaths in 2 ICUs at hospitals affiliated with the University of California, San Francisco were preceded by withholding or withdrawal of life support. In a similar study¹¹ conducted 5 years later in the same

ICUs, it was found that 90% of patients who died in these ICUs did so following a decision to limit therapy. Cardiopulmonary resuscitation (CPR) was initiated in 10% of deaths in 1992/1993 as compared with 49% in 1987/1988. Ninety per cent of patients in whom a recommendation was made to withhold or withdraw life support agreed within less than 5 days, and only 4% refused physicians' recommendations.

Depending on the type of patients, the country and the doctors' preferences, FLST in the ICUs may vary from 1% to 87% withholding and 13% to 99% withdrawing.¹² In a questionnaire survey of 600 American intensivists,¹³ 89% of the respondents had withheld and 87% had withdrawn life support. A European survey¹² found that withholding life support was practised by 83% of the respondents, withdrawal by 63% and euthanasia by 36%.

Withdrawal of ventilators and vasoactive drugs is legal and accepted practice in terminally ill ICU patients in North America, Europe and Australia.¹⁴ Active euthanasia remains illegal, but is practised without consequence of persecution in Holland. In Israel however, the withdrawal of respirators and vasopressors leading to death in these patients is considered by many to be illegal and unethical. Thus, diverse cultural, religious, philosophical, legal and professional attitudes may lead to great differences in attitudes and practices in various countries and in different units within a country. There is no local data on the practice of FLST.

In Singapore, there is no formal policy or guideline on FLST or "Do-not-resuscitate" (DNR) orders although they are practised.^{3,14} There is consensus that the practice of FLST in the ICUs locally conforms with a standard of care consistent with the practice in North America or Australia.¹⁵ This is reflective of the training origins of practising intensivists in Singapore (Table II). There has also been an ethical shift in the local patient-doctor relationship from one of paternalism to that of patient autonomy and disclosure. This has enabled decisions on FLST to take place in a more open, discussive, and consensual manner. However it increases the potential for conflicts and the challenges needed to resolve them in the absence of a consensus between doctors and patient or their surrogates.

TABLE II: TRAINING BACKGROUND OF PRACTISING INTENSIVISTS IN PUBLIC HOSPITALS IN SINGAPORE*

Country of overseas training	Intensivists (n)
USA	8
Australia	7
UK	2

* As of May 1998 and estimated from doctors who underwent overseas training primarily in intensive care medicine

Considerations for FLST

Decisions regarding FLST are usually based on some of these combinations of factors:^{2,11,16}

- nature and course of the acute and chronic diseases,
- specific organ dysfunction (especially the brain),
- number and severity of multiple organ dysfunction,
- response to treatment,
- doctor's assessment of prognosis, and
- patient's or surrogate's request.

Allocation of resources as a reason for limiting life support was frequently discussed among the physicians caring for the patients. However, concern about resources was never cited as a reason for withholding or withdrawing support, nor was the availability of ICU beds, although the units were frequently full.^{2,11} In the authors' units, resource rationing is generally not discussed with regards to prognostic or management decisions on individual patients because of the sensitivities of next-of-kins, and the concerns that it may be an over-riding factor in the doctor's decision to forego non-beneficial therapy.

In some cases, psychosocial considerations may predominate. For example, a decision is made in conjunction with the family to continue treatment until a particular relative or friend could arrive to see the patient. It is important not to miss an underlying depression, treatment of which could change the patient's attitude to living.¹⁶

The various conditions associated with FLST in the medical literature^{2,11,12,16} include:

- terminal metastatic malignancies,
- severe sepsis with multiple organ system failure,
- severe cerebrovascular disorders e.g. recurrent strokes,
- advanced cardiovascular and/or respiratory dysfunction,
- severe dementia, including Alzheimer's disease, and
- disorders unresponsive to maximal therapy.

Bioethical Principles in the Practice of FLST⁶

The principle of beneficence (acting to benefit patients by sustaining life, treating illness, and relieving pain) and nonmaleficence (doing no harm to the patient) have formed the ethical foundation of the practice of medicine from the Hippocratic to the current era. These two principles have also been the ethical bases for decisions by physicians not to treat patients who request nonbeneficial, or futile interventions or those that would be solely harmful. A third principle that has gained acceptance is disclosure: providing adequate and truthful information for competent patients to make medical decisions. Closely related to this is autonomy that gives an informed and capable patient the right to refuse medical therapy; however, this should not give him the right to demand nonbeneficial, futile, or solely harmful

medical interventions. A fifth ethical principle is social justice: allocating medical resources to all citizens fairly and according to medical needs.

Decision-Making Capacity

The patient has decision-making capacity (DMC) if he has:

- 1) possession of a set of values and goals,
- 2) the ability to understand and communicate information relevant to a decision (including his physical condition, the consequences of the treatment being recommended, and the consequences of not receiving treatment), and
- 3) the ability to reason and deliberate about one's choices.³

The patient may seek to confer with family and friends concerning the proposed treatment, but the patient remains the ultimate decision maker.

Surrogate Decision-Making

Patient's DMC for FLST was found in only 0% to 10% of ICU patients.¹² If the patient lacks the capacity of informed consent, prior expressions of the patient's treatment preferences, such as a living will and a medical durable power of attorney, should be given effect (substituted judgement).⁵ When the patient has no advance medical directives, the decision should be made by the surrogate decision maker (SDM) and the physician, on the basis of their understanding of the best interests of the patient. The physician is usually responsible for determining who should act as the patient's surrogate. The SDM are typically the patient's spouse, adult children, parents, friends and sometimes court-appointed guardians or ombudsmen. Actual hierarchy may be dictated by the local prevailing law. A SDM must pass certain tests of moral validity in addition to legal standing in the hierarchy of decision makers.⁵ In this regard, the physician must be prepared to act as patient advocate if he is suspicious of the SDM's capacity to act in the patient's interest.

Implications of the Advanced Medical Directive (AMD) Act for FLST in Singapore

The AMD Act was passed as law in May 1996 to "provide for, and give legal effect to, advance directives to medical practitioners against artificial prolongation of the dying process and for matters connected therewith." The AMD Act arose upon the deliberations of the National Medical Ethics Committee, formed in January 1994, which recommended that "legislation on AMDs is required to provide patients with the legal means to continue to exercise autonomy over their medical treatment even when they are incompetent and in the final stages of their terminal illness."

The operational procedures of the AMD, as determined by the AMD Regulations 1997, provide enough safeguards to ensure that it cannot be exercised inappropriately or be expanded beyond its originally intended scope. Some of these safeguards, which have been described elsewhere as potentially "cumbersome",¹⁷ include the following:

- The AMD can be revoked in a simple expedient manner.
- It is operative only under the strictest of conditions (unconsciousness or incompetence, imminent death, already requiring extraordinary life-sustaining treatment).
- It cannot be exercised in a hurry; termination of therapy can be effected only after confirmation of its existence with the Registrar at the Ministry of Health, upon fulfilment of conditions as described above and upon certification of terminal illness by two other doctors who must be specialists.

The confines and safeguards of the AMD Act are likely to have several practical implications. The AMD cannot be exercised by a conscious terminally ill individual as a means of withholding such acute therapies as endotracheal intubation, mechanical ventilation, anti-arrhythmic drugs or inotropic support. Indeed, as the existence of a patient's AMD cannot be revealed or sought prior to loss of judgement, consciousness, or initiation of life-sustaining therapy, it cannot be invoked pre-emptively by the patient to request for a DNR order, or to withhold acute therapies should he eventually lose consciousness.

It would therefore appear that the AMD best serves the patient with a previously undiagnosed or stable illness that deteriorates acutely and catastrophically, resulting in acute loss of consciousness, self-determination, and vital organ function. Initial treatment and maintenance with extraordinary life-sustaining therapy can then be withdrawn upon confirmation of the AMD's existence and fulfilment of all the conditions for its exercise.

Nonetheless, the fact that a person has signed an AMD does not prohibit him, while still lucid, from informed and open discussions with his doctors on his wishes regarding end-of-life management. For the majority of other groups of patients not covered by this specific situation, continual informed communication with next-of-kins and attending doctors would remain the main channel by which self-determined decisions on FLST can be made within the confines of sound ethical practice.

Mechanics of Decision Making

Therapy that benefits the patient should be determined by shared decision making, with the physician imparting the medical realities and the patient imparting his goals as defined by the patient's own subjective

values, hopes and priorities, perception of family or other responsibilities, religious and philosophical beliefs.^{5,18} Individual decisions are also influenced by such divergent factors as the wishes of the family and friends, institutional policies, cultural mores, economic considerations and societal concerns.

After the patient and physician achieve agreement on the goals to be pursued through an intensive care programme, the patient has the right (based upon the principles of autonomy, self-determination and privacy) to accept or refuse any recommended treatment including life-sustaining treatment. If there is medical consensus that further medical intervention cannot fulfil the goals established earlier, there is no ethical obligation to continue or initiate non-beneficial treatment or to present treatment alternatives that are considered non-beneficial to the family.^{5,10} If a physician decides to withhold such an intervention, he has a responsibility to inform the patient or SDM of that decision and to explain the decision's rationale.

It is important to include the nursing staff in family discussions and decision-making process to ensure that the ordered (intended) therapy is the same as the delivered therapy.⁴ The physician who is directing a course of withdrawal or withholding of therapy also has the responsibility to ensure continuity of comfort care and to prevent the misconception of abandonment.

Outcome of Patients who have FLST Orders

Not all patients who have FLST die; 0% to 18% survive, typically DNR patients as opposed to patient undergoing withdrawal of therapy.¹² Judgements for individual patients are based on clinical decision-making and not on infallible prognostic scoring systems. When physicians were provided with a prediction of a patient's outcome, the doctor's use of ICU monitoring and treatment changed. Decisions for FLST can become self-fulfilling prophecies even in those patients who might have survived.^{12,19}

Despite the great scarcity of critical care beds throughout the world, patients who have therapies forgone and whose doctors believe will die, are usually not discharged from the ICU (0% to 50%).¹² This is not an efficient use of a scarce resource. It may be justified, however, because of the lack of another appropriate labour-intense facilities and to avoid feelings of abandonment at such a critical time. As practised in the authors' units, patients undergoing a terminal wean from therapy are not discharged from the ICU if there is indication of imminent death within the next 24 hours or so. This provides some measure of comfort from the familiar ICU environment to grieving relatives, and recognises the value of the ICU nurses and doctors in managing this dying process empathetically.

However, other doctors may consider transferring the patients out of ICU earlier if they feel that the ICU may not provide a suitable environment for such dying patients with the alarms from the machines, bustling activity and the lack of privacy.

Mechanism to Resolve Conflicts

In view of the pluralistic nature of current society regarding values and goals in life, some conflicts regarding these decisions or their implementation can be expected to arise.⁵ To force physicians to provide medical interventions that are clearly non-beneficial would undermine the ethical integrity of the medical profession.¹⁰ If the patient or SDM disagrees with the decision to limit the intervention or the physician cannot in good conscience believe continuing the care of the patient, either party should have the opportunity to transfer responsibility for the patient's care to another physician who is willing to provide the disputed intervention in the same or another institution. If no such physician can be found, or if transfer between institutions is not medically or otherwise possible, the intervention may be withheld or withdrawn in accordance with institutional policies and applicable laws.¹⁰

To restrict access to limited institutional resources is the right of a health care institution and not that of an individual physician because of the institutional nature of this issue. Hence, many hospitals in the US and Europe have institutional dispute resolution mechanisms, such as an ethics committee which serves as a forum for the discussion of ethical dilemma and provide consultation for specific issues. It is a multidisciplinary committee, including not only health care providers such as doctors, nurses, respiratory therapists and social workers, but also religious leaders and legal advisers. Although hospital ethics committees exist in Singapore, their role is mainly in vetting research protocols. We are not aware of any cases of ethical conflicts concerning FLST in medically futile patients which have been referred to such committees.

The courts should be used only as a last resort. If cases must go to court, the court will usually be strongly influenced by the medical facts of the case and standard practice as set for by the medical profession.⁵ There is no known precedence of such conflicts being presented to the local court in Singapore.

Ordinary versus "Extraordinary" Treatment

Usually basic life support such as food, water, and supplementary oxygen is provided as a reflex action when caring for patients.⁶ Such ordinary therapies are regarded as "mandatory", and offer a reasonable hope of benefit for the patient without excessive expense, pain or other inconvenience.²⁰ Conversely, extraordinary measures are any treatments that may impose a greater

burden of pain, expense or inconvenience to the patient, than benefit, and thus may be withheld or withdrawn. Unfortunately, this kind of terminology is a cause of confusion rather than clarity in end-of-life issues.²¹ The value of all medical interventions may instead be simply described in terms of their potential benefits and burdens for individual patients rather than being regarded as ordinary or extraordinary.

Artificial Feeding

A number of court cases in America and the UK have defined nutrition and hydration as medical treatment, which can be withdrawn when an overall decision has been made to withdraw all medical therapies." A competent patient may decide to terminate nutrition and hydration. Nutrition and hydration for incapacitated patients often entail involved medical procedures, such as gastrostomies and parenteral nutrition, which may at times be more complicated than the rest of the treatment programme.

Life Support and Permanent Vegetative State

The persistent vegetative state (PVS) is a form of eyes-open permanent unconsciousness in which the patient has periods of wakefulness and physiological sleep/wake cycles, but at no time is the patient aware of himself or his environment. Neurologically, being awake but unaware is the result of a functioning brainstem with damage to the hippocampus, deep forebrain nuclei, hypothalamus, thalamus and loss of cerebral cortical function.²² The Multi-Society Task Force on PVS has concluded that "a PVS can be judged to be permanent 12 months after a traumatic injury in adults and children; recovery after this time is exceedingly rare and almost always involves severe disability. In adults and children with non-traumatic injuries, a PVS can be considered to be permanent after three months; recovery does occur, but it is rare and at best associated with moderate or severe disability."²³

Patients in a PVS may have "prolonged survival" as long as the artificial provision of nutrition and fluids is continued. These patients are not "terminally ill." PVS patients do not have the capacity to experience pain or suffering as they are permanently and completely unconscious. Pain and suffering are attributes of consciousness requiring cerebral cortical functioning.^{22,24}

In 1975, efforts by the family of Karen Ann Quinlan initiated a movement towards an ethical and legal consensus for families and other proxies to authorise the termination of all forms of life-sustaining medical treatment, including hydration and nutrition, for patients in a PVS.²⁵ The existence of a PVS alone should not dictate the withdrawal of life support. Discontinuation is made in accordance with the principles and practices governing the withholding and withdrawal of other forms of

medical treatment, i.e. based on a careful evaluation of the patient's diagnosis and prognosis, prospective benefits and burdens of the treatment, alternative treatment options, stated preferences of the patient and family, and institutional guidelines.^{5,22}

Withholding versus Withdrawing of Life Support Therapy

Traditionally, health care providers have had greater difficulty withdrawing than withholding life-sustaining treatments. The Society of Critical Care Medicine's Ethics Committee reported that 89% of the 600 critical care professionals surveyed had withheld and 87% had withdrawn life-prolonging treatments.¹³ Although 56% of the respondents were not disturbed by withholding or withdrawing treatment, 26% were more disturbed by withdrawing than by withholding treatment.

A legal and ethical consensus has developed in the US stating that there are no differences between withholding and withdrawing life-sustaining treatments.⁵ The US President's Commission and leading ethicists have stated that no moral difference exists between withholding and withdrawing life-prolonging therapies. However, there may be religious differences between withholding and withdrawing life-sustaining treatments. Some Orthodox Jewish scholars for example, hold that withdrawing life-sustaining treatments is not permissible.

From a medico-legal and psychosocial standpoint, it is clearly beneficial to the patient for withholding and withdrawal of therapy to be treated equally. This permits the physician to initiate aggressive therapy provisionally when an unfavourable outcome or co-morbidity is suspect but not clearly established, than to withhold a treatment altogether for fear that stopping will be impossible. Such a therapeutic trial provides the basis for a more accurate decision about the value of withholding or using treatment.

Provision of "Comfort Measures" during Withdrawal of Life Support

Sedation in the form of narcotics and the use of anxiolytics were frequently (70%) given to patients who were not brain-dead during withdrawal of mechanical ventilation, to reduce their air hunger, pain and anxiety.²⁴ It is ethically permissible to provide such "comfort measures" even if the patient's death may be unintentionally hastened in the process.

In the dying patient, the prolonging of life is no longer a goal. To do so is to artificially prolong the dying process. Therefore, relief of suffering becomes the primary goal. To deny comfort measures in such a situation, regardless of the fact that they may depress respiration or blood pressure, would be to deny the patient one of the few interventions that can increase comfort at a time he most needs it.²⁶ The patient or his

SDM should be informed of, and agree with the "double effect"²⁷ of such palliative therapy.

A patient's death caused by the termination of life support is not considered criminal because the intent in the removal of life support is to relieve suffering, rather than to bring about death, and to allow nature to take its course. Unfortunately, the term "passive euthanasia" is sometimes used to describe withholding and withdrawing life support and this complicates communication. Physician involvement in assisted suicide and active euthanasia, even if requested by the patient, is not endorsed by the ATS.¹⁰ Euthanasia is not consistent with the role of the physician as a healer who is committed to the sanctity of life.⁶ Certainly euthanasia is anathema to the community of intensivists in Singapore.

Conclusion

The goals of the ICU health care team are to save the salvageable and help the dying have a peaceful and dignified death. No physician was ever found liable for terminating treatment at the request of a competent adult.²⁴ On the other hand, by not complying with a request to terminate treatment, the physician may become liable for pain and suffering caused by unwanted care ("the right to die suit").⁴

Limitations on access to intensive care are inevitable because of competing societal needs and may lead to conflicts between health care providers and patients/surrogates. The courts and judges may not be adequately trained to handle and lack the experience to confront such biomedical-ethical conflicts. It is therefore imperative that a societal consensus be reached on how to fairly allocate such expensive high-technology medicine.²⁸ Ultimately, a set of guidelines on FLST must be developed and implemented on sound medical, ethical, cultural, religious and legal bases.

REFERENCES

1. Lew T W K, Grenvik A N A. Brain death, persistent vegetative state, donor management and cessation of therapy. In: Albin M, editor. *Textbook of Neuroanaesthesia*. New York: McGraw Hill, 1996:1361-81.
2. Smedira N G, Evans B H, Grais L S, Cohen N H, Lo B, Cooke M, et al. Withholding and withdrawal of life support from the critically ill. *N Engl J Med* 1990; 322:309-15.
3. Sahadevan S, Pang W S. Do-not-resuscitate orders: towards a policy in Singapore. *Singapore Med J* 1995; 36:267-70.
4. DeVita M A, Grenvik A. Foregoing life-sustaining therapy in intensive care. In: Ayres S M, Grenvik A, Holbrook P R, Shoemaker W C, editors. *Textbook of Critical Care*. 3rd ed. Philadelphia: WB Saunders Co, 1995:1802-8.
5. ACCP/SCCM Consensus Panel. Ethical and moral guidelines for the initiation, continuation, and withdrawal of intensive care. *Chest* 1990; 97:949-58.
6. Raffin T A. Ethical concerns in managing critically ill patients. In: Parrillo J E, Bone R C, editors. *Critical Care Medicine: Principles of Diagnosis and Management*. Baltimore: Mosby Year Book Inc, 1995:1447-64.

7. Schneiderman L J, Jecker N S, Jonsen A R. Medical futility: its meaning and ethical implications. *Ann Intern Med* 1990; 112:949-54.
8. Kobayashi J S. When may critical care be terminated? In: Parsons P E, Wiener-Kronish J P, editors. *Critical Care Secrets*. Singapore: Info Access & Distribution Pte Ltd, 1992:444-7.
9. Lanken P. ATS position statement on withholding and withdrawing life sustaining therapy. *Ann Intern Med* 1992; 115:478-85.
10. American Thoracic Society Task Force, an ad hoc committee of the Section on Critical Care. Withholding and withdrawing life-sustaining therapy. *Am Rev Respir Dis* 1991; 144:726-31.
11. Prendergast T J, Luce J M. Increasing incidence of withholding and withdrawal of life support from the critically ill. *Am J Respir Crit Care Med* 1997; 155:15-20.
12. Sprung C L, Eidelman L A. Worldwide similarities and differences in the forgoing of life-sustaining treatments. *Intensive Care Med* 1996; 22:1003-5.
13. Society of Critical Care Medicine Ethics Committee: Attitudes of critical care medicine professionals concerning foregoing life-sustaining treatments. *Crit Care Med* 1992; 20:320-6.
14. Lee K H. How far is enough in the intensive care unit? *Singapore Med J* 1995; 36:583-5.
15. Luce J M. Withholding and withdrawal of life support: ethical, legal, and clinical aspects. *New Horizon* 1997; 5:30-7.
16. Williams R. The "do not resuscitate" decision: guidelines for policy in the adult. *JR Coll Physicians Lond* 1993; 27:139-40.
17. Lee K O, Quah T C. Living, dying, death and advance directives. *Singapore Med J* 1997; 38:141-2.
18. Flynn E P. Important distinctions in issues in Medical Ethics. In: *Issues in medical ethics*. Kansas City, MO: Sheed & Ward, 1997:276.
19. Lynn J, Harrell F, Cohn F, Wagner D, Connors A F. Prognoses of seriously ill hospitalized patients on the days before death: implications for patient care and public policy. *New Horizon* 1997; 5:56-61.
20. Kelly G. *Medico-moral problems*. St Louis, MO: Catholic Health Association, 1958:129.
21. Burns J I, Truog R D. Ethical controversies in pediatric critical care. *New Horizon* 1997; 5:72-84.
22. American College of Neurology. Guidelines on the vegetative state: Position of the American Academy of Neurology on certain aspects of the care and management of the persistent vegetative state patient. *Neurology* 1989; 39:125-6.
23. The Multi-Society Task Force on PVS: Medical aspects of the persistent vegetative state. *N Engl J Med* 1994; 330:1499-508 (Part I); 1572-9 (Part II).
24. Mishkin D B. You don't need a judge to terminate treatment. *J Intensive Care Med* 1990; 5:201-4.
25. Angel M. After Quinlan: The dilemma of the persistent vegetative state. *N Engl J Med* 1994; 330:1524-5.
26. Couderc G H, Dearwater J A. Ethics. In: Parsons P E, Wiener-Kronish J P, editors. *Critical Care Secrets*. Singapore: Info Access & Distribution Pte Ltd, 1992:442-4.
27. Grenvik A. "Terminal weaning": Discontinuance of life-support therapy in the terminally ill patient. *Crit Care Med* 1983; 11:394-8.
28. American Thoracic Society Bioethics Task Force. Fair allocation of intensive care unit resources. *Am J Respir Crit Care Med* 1997; 156:1282-301.