

Ethical problems in dialysis: prospects for the year 2000

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The quest for ethical foundations in the practice of medicine goes far back in the mists of time: the Hippocratic oath is hardly more than a synthesis, handed down to us, of ethical principles already ongoing in the fourth century B.C. But bioethics as a discipline is of recent origin, arising in the early 1960s out of the growing demand for answers to the complex ethical problems that arrived on the wave of the ground-breaking advances in medical knowledge and techniques. In this context, one may broadly agree with many who see dialysis and kidney transplantation as having played a basic role in the foundation of bioethics.

The birth of nephrology and dialysis

Ever since the introduction of chronic dialysis and kidney transplantation, between the late 1950s and the early 1960s, despite the enthusiasm engendered by these revolutionary therapies which enabled the survival of patients otherwise destined to die, it was clear that they raised important problems appealing to the conscience of the physician. Capacity for treatment was quite unable to keep pace with demand, so it was necessary to select patients for treatment. But according to what principles? The principles identified were the subject of ongoing polemics [1], and it was impossible to settle on adequate ones. The problem was a difficult one and continues to be so, although one may not always be fully aware of it.

Economic situation and dialysis

In the 142 countries of the world for which data exist, there are enormous disparities in the funds available for minimum basic health coverage. The richest fifth of the world's population enjoys an income 50 × that of the poorest fifth [2]. In 1987, average world health expenditure per caput was US\$162 but varied from \$675 in the developed countries to \$11 in the developing ones, with a linear correlation between per caput gross

national product (GNP) and per caput public health spending [2]. This is irrespective of political and ideological systems.

In 1992, application of dialysis therapy ranged from 214 patients per million population (pmp) per year in the US to eight pmp in Turkey, five in China, three in India and none in many African countries [3], and below an annual per caput income of \$3000 per year, dialysis was virtually non-existent.

From these data alone an initial ethical problem arises—for the moment without solution: whether it is morally acceptable that in the wealthy nations treatment is provided even for patients over eighty years of age affected with many associated pathologies, whereas elsewhere twenty-year-olds die from lack of resources.

Is there selection of patients even in the rich countries?

In the economically advanced countries the 'right to health' is seen as a cardinal point in the social contract between state and citizen, but in reality this contract is often side-stepped. In Italy we are convinced that we dialyse all patients who need it, but the number of pmp put on dialysis every year in our country represents about half the numbers accepted in the US and Japan. This discrepancy has been ascribed to the genetic differences, and differences in the health and hygiene conditions, of certain racial groups in the US, or to unconscious selection performed by the family physician, and even by nephrologists, in Italy (and elsewhere in Europe). None of these explanations is fully adequate; though, taken together, they may help to account for part of the discrepancy.

Health policy and ethical implications

One reason underlying the different amounts of dialysis in the rich countries may be their different health policies. For instance in 1990, patients on treatment in the UK were half, and annual intake was two-thirds, of the numbers of other European countries such as Germany, France and Italy [4]. Way back in 1948, the UK was one of the first European countries to establish a general public health system. With the advent of

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dialysis, the British National Health Service (NHS) set up some dialysis centres in major cities, with small numbers of dialysis beds and few nephrologists. At the end of the 1980s there were 1.3 dialysis centres per million population compared to 4.4 in France, 5.6 in Spain, 6.3 in Germany and 7.1 in Italy, and nephrologists numbered between one fifth and one tenth of those in the aforementioned countries. The need to limit costs led to favouring home dialysis treatments and transplantation, and this would seem, in itself, to be a wise choice. But, in the event, the policy implemented led to a negative selection of patients to be treated, by the family physician, by specialists and even by nephrologists, based on the conviction that the patient not suitable for transplantation or home dialysis would not find a dialysis place. This, in turn, led to a gradual discrimination of patients over the age of 50, or with other severe associated diseases. A less visible discrimination was practised on the basis of sex (female), language, race, distance of patient's home from dialysis centre, and patient suspected of being unco-operative [4]. A turning-point came only with the arrival of continuous ambulatory peritoneal dialysis (CAPD) which enabled an almost unlimited number of patients to be placed on dialysis since it was not restricted by the availability of dialysis places, equipment and medical staff.

This example provides a clear illustration of how a centrally-programmed policy with limited resources may become a source of illicit discrimination among citizens, but at the same time it confronts us with the serious problem of how a full treatment can be compatible with the need to balance the national budget.

A second ethical problem demonstrated by the British case concerns the repercussions of scarcity of funds or structures on the choice of therapy. For the reasons mentioned above, in the UK, 50% of patients on dialysis are on peritoneal dialysis compared with a European average of 13% [5,6]. A similar, more serious example is provided by Mexico [5,6], where peritoneal dialysis involves 91% of patients, since haemodialysis is not refundable. Moreover, since peritoneal dialysis is only performed in hospital, for 50% it is only done intermittently instead of continuously, with unsatisfactory results. In other countries—again for economic reasons—haemodialysis is exclusively, or almost exclusively, practised [5,6]. Wide discrepancies in the practice of the two treatments may also exist in one and the same country. Owing to the large number of private centres in certain regions of Italy, which are not authorized to practise anything other than haemodialysis, or have no interest in doing so, the practice of peritoneal dialysis ranges from almost 0% of patients in Basilicata and Campania to 50%+ in Umbria and Val d'Aosta [7]. Is it ethical for a purely medical choice to be influenced by non-medical reasons? The question is obviously rhetorical.

Health expenditure and its subdivision: how to proceed with equity

Health expenditure has to compete with other expenditures, themselves also essential for health. Dialysis in

Italy costs over 2000 billion lire per year, equivalent to around 3% of global health spending, but dialysis is only one of a host of medical treatments capable of saving life, and an elementary principle of equity requires that the financial resources devoted to health be fairly distributed among all the necessary therapies. In the US 92–95% of citizens can rely on free treatment for terminal renal failure through the Medicare system, but between 32 and 37 million Americans have no access to free basic medical treatment, and these include pregnant women, newborn infants and children, with a resulting high neonatal and infant mortality, serious nutritional defects and growth deficits [2]. Today, in our country, dialysis centres exist in all cities and often in small urban centres, but in some residential areas there is no hospital or the hospital is unprovided with transfusion services, intensive care centres, coronary care units, or rational up-to-date structures for reception of elderly patients without assistance or terminal cases.

In the state of Oregon, US, various local citizens' committees, made aware of the problems of bioethics, have been involved in a 'Health Decision Process' on the allocation of health resources. This has produced legislation based on advice from public committees and on cost-benefit considerations. However, the restrictions introduced in Oregon actually concern only poor people, since those with adequate means have access to all treatments, and this has generated severe criticisms of an ethical nature [8]. A different, equally interesting formulation is contained in the recent final report on 'Priorities in Health Care; Ethics, Economy and Implementation', published in Sweden by a parliamentary commission after lengthy enquiry and public debate [8]. The Swedish report avoids going into detail about individual treatments and confines itself to classifying the priorities by categories of disease: therapy for acute life-threatening diseases, serious chronic diseases, terminal palliative therapies and treatment for persons with reduced autonomy have maximum priority, whereas treatments for a variety of conditions resulting from disease or lesion, such as cosmetic treatments, sterilization, circumcision, are not eligible for state funding.

These topics are of great interest and also concern us nephrologists. For instance, the Oregon legislation, as first formulated, denied public funds for transplantation, on the grounds that the same expenditure for transplanting 24 patients in the following 2 years would suffice to ensure basic health care for a further 1500 people. Subsequently, after some striking cases had come to public notice, more attention was paid to the rule of saving life, i.e. on the fitness of allocating resources to life-saving treatments [8].

Is it ethical to select patients for dialysis?

While it is not up to us to decide how expenditure should be apportioned among the various diseases, we certainly are responsible for determining whether or

not to place all patients with terminal uraemia on dialysis. The topic of selecting patients in need of chronic dialysis therapy has received scant attention in the literature [9,10], and the few contributions are certainly not above criticism. Exclusion on the basis of economic standing, personality and social utility is unacceptable.

The motives for exclusion from dialysis have included non-uraemic dementia, incurable neoplastic disease, terminal stages of epileptic diseases, heart and lung diseases, irreversible neurological diseases, multiorgan failure making survival extremely unlikely; and, again, the need to restrain or sedate the patient during dialysis sessions in order to maintain access functioning [9,10]. These exclusions seem reasonable, but from the individual cases serious problems of conscience arise which at times divide us.

Quite recently, we were asked to evaluate a terminal uraemic patient, 34 years of age, suffering from serious chronic schizophrenia which did not respond to neuroleptic drugs, and with grave dipsomania. In the course of the last few years the patient had been hospitalized 57 times, he was disorganized, dissociated and subject to constant hallucinations. He was unable to conduct himself at behavioural level and frequently required restraint and isolation, in order to control his inordinate intake of water. Restraint would have been indispensable for setting up vascular access to dialysis and would have needed to be extended, again in view of his serious dipsomania, also to the intervals between dialysis. Indeed, dialysis would actually have further worsened the quality of life of this patient, which was already very poor. In agreement with colleagues in psychiatry, a non-indication for dialysis was registered. But subsequently, with the onset of advanced uraemic symptoms, some colleagues expressed doubts on whether it was ethical to deny dialysis to the patient, and these doubts were compounded by fears of legal action. Since it was not possible to convene an ethical committee to discuss the contrasting opinions, one night the patient was given emergency dialysis, thus initiating a treatment which could not thereafter be withdrawn. As predicted, the patient now requires continual restraint, needs round-the-clock expert nursing care—which is very expensive—suffers continual hypertensive crises, and his life conditions have further deteriorated. It is my opinion that the decision to dialyse in this case was far from being ethical and is a reflection of therapeutic obstinacy, to which, however, I was unable to offer effective opposition.

Dialysis in the elderly

Dialysis withholding in the elderly is certainly one of the most hotly debated topics in literature (see the detailed survey in ref. 4), but the age threshold has been increasing over time with the ageing (in good conditions) of the population. If the criterion for judgment is the benefit accruing from therapy, it is certain that life expectancy will be greater in the

youthful than in the elderly subject. If, however, we evaluate the recovery of years of life obtained by dialysis in the dialysed patient as against the non-uraemic, we realise that this is greater in the elderly than in the young: according to Kjellstrand [11], in young subjects 5-year mortality is $20 \times$ greater in those dialysed than in non-uraemics, whereas in the over-70s it is only twice as great. Other considerations bear on the economic side of the problem: the elderly patient has contributed more to the national health service than the young one, and it would be odd if healthcare were to be withheld from the former. Furthermore, the elderly person is better suited to home dialysis, which is less expensive, and, if active, the person may also be socially more useful in view of his greater heritage of knowledge and experience. In the Battelle Study [12], of 859 dialysed people with Karnofsky's index it emerged that the patients aged 65 years or over had a greater appreciation of life in general and a better functional status and higher indices (of well-being, appreciation of marriage, family life, investment, saving, and standard of living) than the patients under 65.

The reverse side of the coin is that elderly persons with renal failure often have associated diseases which themselves may involve very severe suffering, as in the case of associated malignant tumours. Eli Friedman, the well-known American nephrologist who is not afraid of plain speaking, has said that the current practice of US dialysis centres is to dialyse 'legions of zombies' [13]. It has been calculated that over 65 years of age, 2-year actuarial survival occurs for 25% of patients admitted to hospices [14] and 10% of patients with systemic diseases [10]; the proportion is only 15% one-year survival in patients requiring amputation of a limb [10]. The prospects are even worse when two serious pathologies combine, such as hepatic failure, sepsis, respiratory failure requiring ventilation, or coma. In such cases, Foley [15] has calculated a 6-month mortality for 85%. Lastly, several diseases feature renal failure in their terminal stage.

'Is there a right time to say no to life?' [16]

Does the physician have the duty to prolong life at all costs or are there situations in which it is possible to deny life? According to bioethicists, the physician must beware of two extremes: 'therapeutic obstinacy' and 'therapeutic laxity' [17]. In the first case, the physician appears as though possessed by a delirium of power, which gives the illusion of omnipotence, of never having to give up. In the second case, with the reference-point of a life fully and independently lived, the physician risks underestimating the patient's desire to live; for the patient, back to the wall, may willingly accept a number of restrictions and limits imposed by an invalidating disease and feel that the life still allowed is well worth living even under such conditions.

Canadian nephrologist David Hirsch states that it is *not* reasonable to make a negative selection of elderly

patients with serious associated pathologies [10]. The patient must be informed of the appropriateness of the treatments offered—and these must in no way be denied—but there is also the duty to make specific recommendations which will help in deciding whether to accept treatment or not. The patient must be made aware of the limited life expectancy and of the quality of life that can be predicted, plus the many hospitalizations that may be necessary. The final decision, however, must be the patient's alone, and there must be no pressure to make choices on the grounds of financial limitations. Proceeding in this way, around 25% of uraemics, patients with low Karnofsky's index, or serious cardiovascular disease, or diabetes, or neurological disease, decline dialysis. But the singular thing is that this percentage is no different from that of other centres that do not follow a similar procedure; from which one may deduce that in all Canadian centres it is the practice to select which patients to put on dialysis [10]. For that matter, the author states, selection is practised everywhere in the field of organ transplants without raising any outcry—even heart transplants, exclusion from which means certain death at short interval. Kjellstrand, too, thinks it reasonable to withhold dialysis from patients with a probable life expectancy of less than 6 months [18].

In a study by Holley and co-workers, about 90% of dialysed patients at West Virginia University said they would wish to be informed by physicians in case of serious diseases and some 80% wished to be involved in decisions regarding therapy [19].

Equally problematic is the selection of patients on the basis of evaluation of life expectancy, since it is hard to make such evaluation in an objective way. In practice, the aim is to preserve the largest number of lives, at equal cost, achieving the maximum duration and quality of life. In the view of the Counsel for Ethical and Judicial Affairs of the American Medical Association [20] the best thing is, probably, to define expected quality of life in terms of functional state. But even this criterion seems questionable and not immune from hazards. In any case, it is inappropriate to treat several persons in an inadequate way—for instance, performing two instead of three haemodialyses per week; whereas it is correct to counsel less expensive home dialysis [10].

Withdrawing dialysis

Even more dramatic ethical problems stem from another, increasingly frequent phenomenon, namely dialysis withdrawal. Many papers (4,11,16–19,21–31) have focused attention on this phenomenon which summons our attention (and our conscience) to the legitimacy of ending life before its term. Catalano [24] has shown, over a total of 3000 dialysed patients studied, that the problem is of small importance in Italy, since it accounts for less than 1% of deaths. In Europe, the mean incidence is reported as 4%, but in 1985 extremes of 15% were already reported in

Stockholm [21]. In countries outside Europe, dialysis withdrawal is the third cause of death in the general population and the second among the elderly after cardiovascular disease. Figures range from 12% in Canada to 16% in the US, Australia and New Zealand, with peaks of 18% in California and 28% in Toronto, way back in the early 1980s [19]. In the US the percentage is on the increase: from 9.7% of causes of death in 1989 to 17.6% in 1996 [27].

The lower percentage in Italy and Europe generally should not lead us to underestimate the problem: this incidence might be only the tip of an iceberg that is largely invisible because dialysis withdrawal is not recorded among the causes of death, it being confined to the relationship between the patient's family and his physician. In addition, we have become accustomed to acknowledging social or custom problems with a time-lag of one or more decades after they manifest in America. And it has been claimed that where there is a low percentage of withdrawals there is a higher percentage of suicides. The hypothesis has also been advanced that some unexpected deaths in the home may be due to excessive introduction of liquids or foods with a high potassium content in patients well aware of the hazards of such excesses; so that these, too, may be suicides.

The percentages of withdrawal increase with the duration of treatment, in the US as well as in Japan [16,27], and especially with the advancing age of the patient; withdrawal is much more frequent among whites than blacks, probably owing to blacks' mistrust of whites, who dominate the medical and health world [27]. In the US, Asian patients show much the same percentages as blacks, native Americans the same as whites [27]. But exceptions are not lacking as regards the age effect. In Japan the incidence is 5.5% below 15 years of age and 0.5%, ten times less, above 60 years, presumably in a cultural perspective which privileges respect for the elderly and makes transplants more difficult, thus removing the reasons for keeping children and adolescents precariously alive [28]. Lastly, the latest US report [27] showed no differences between extracorporeal and peritoneal dialysis. The reasons for dialysis withdrawal were insufficient profit [15.6%], medical complications [12.9%], lack of vascular access [1.7%], and other reasons [6.9%].

These percentages and differences make it clear, however, that dialysis withdrawing is not only based on the evidence of a state of health that is no longer acceptable, but is also influenced by other factors, among which are the personal view of the value of life, psychological support from the family, the teachings of the religion to which the patient belongs, and the attitude of individual societies towards fundamental ethical principles.

Ethical principles and dialysis withdrawal

In the US, great emphasis has been laid and continues to be laid on the principle of 'autonomy'—that is, the

right of the patient, sanctioned by laws and constitutional provisions, to accept or discontinue a treatment, or to choose among different treatments. In the decision to withdraw dialysis, the principle of autonomy is combined with that of beneficence (i.e. the duty to do good to the patient) and that of not doing harm (*primum non nocere*), according to which any treatment that, far from conferring any well-being, prolongs the patient's suffering, is unethical. In Italy, similar principles are embodied in the new deontological code of the Italian Medical Association. Another argument, often adduced, is the right of the citizen to the 'dignity of death'. However, withdrawal of dialysis does not always ensure a death without suffering. An analysis of 11 patients who withdrew dialysis found that the 'quality' of death from uraemia was good in seven and bad in four [29].

Generally speaking, in the US the request by patient and physician to withdraw treatment must take account of this, evaluating the reasons and, where possible, involving a local ethical committee or an Interdisciplinary Treatment Team, which is invested with responsibility for the final decision. In deciding to discontinue treatment, the essential elements are the evaluation of the patient's awareness and ability to express wishes and the objectivity of the clinical situation that justifies the request. If the request is felt to be sufficiently well grounded, withdrawal may begin; otherwise, it should not be undertaken, for literature reports cases of patients who subsequently expressed gratitude for being kept alive even against their will.

When the patient is incapable of understanding and willing, the request may be advanced by family members or by the physician himself. The intuition of what the patient, if autonomous, might wish often disappears beneath all kinds of selfishness or an excessive desire to prolong life.

In Italy, ethical committees or interdisciplinary treatment groups exist only in a few large hospitals. Hence the decision is almost always the responsibility of the physician. But whose is the decision? Does it rest solely with the head of the department, even when other members of the staff disagree, perhaps owing to a difference of sensitivity, linked, say, to a stricter interpretation of religious doctrine? The problem here is to prevent the final choice from being an arbitrary one, and thus differing from one physician to another, and perhaps being swayed by temporary suggestions, or by cultural and other influences.

Lastly, there are legal hazards, at least in Italy where the law has neglected the problem of when therapeutic obstinacy may actually be non-ethical; whereas the law is strict in cases of omission to provide assistance. In the US, on the contrary, hazards have been minimal following certain rulings of the Supreme Court [32]. In spite of which, in an enquiry among nephrologists in New England, 90% stated that they withdrew dialysis if the patient's wish was known and the family members were in agreement; 63% withdrew dialysis even if the patient's wish was unknown, provided family members

agreed; only 1% did so in the absence of both these conditions [30].

In the US, the Patient Self-Determination Act of 1990, passed by Congress [31], encourages patients to give advance directives regarding their desire to continue to be dialysed or not, or to undergo emergency intensive therapy to be kept alive, should loss of consciousness, dementia, or conditions considered to be terminal supervene. The advance directive may take the form of a genuine directive to the physicians ('living will') or may appoint a 'health care proxy'. According to the Supreme Court, the patient capable of understanding and expressing wishes has the right, guaranteed by the Constitution, to choose whether to accept or refuse a treatment [32]. It would seem, however, that only 20% of patients in the US actually give advance directives [33]. In a survey performed in Pittsburgh, not all patients were willing to sign an advance directive, but 80% of those who did so stated that it was a good procedure [33]. However, 50% of the patients admitted to the fear that signing a living will might influence the subsequent conduct of physicians, and indeed it has been calculated that the cost of terminal hospitalization for patients who provide a living will is $3 \times$ less than for others [34]. Some data suggest that advance directives may contribute towards a 'good death', especially when the patient has a strong bond with a spouse or life companion. In these cases, death may occur in a state of tranquillity and harmony [35]. But one essential point emphasized by all is that throughout the terminal stage, usually lasting between one and two weeks, the patient should receive qualified assistance, with counsel aimed at preventing suffering (such as limiting fluid intake to obviate pulmonary oedema) and with treatment to alleviate it [35]. The patient has the right at any moment to change his/her mind and to resume dialysis.

While the principles of autonomy, self-determination and independence of the patient are currently the dominant criteria, the hope has also been expressed [36] that in the next stage of development, which seems to already be under way, these principles will be combined with that of the common good of society and its common objectives. It has been proposed to implement a procedure like the one already established in Oregon, to finance, or not, individual therapies, with the aim of setting up definite, general standards on dialysis withdrawal for patients incapable of understanding or willing, even where family consent is lacking [36].

But, clearly, 'to play God', the phrase used in the American press—that is, to decide to withdraw or to continue a life-saving treatment—is much harder than to decide whether or not to pay for a treatment, and several physicians decline to take on the role of 'providers of death'. Nonetheless, one should be aware of this trend.

The Catholic Church point of view

Dialysis withdrawing must not, however, be viewed as a form of euthanasia or assisted suicide. According to

the Vatican Statement on Euthanasia of 1980, 'it is permissible, with the patient's consent, to discontinue treatments whose results have fallen short of expectations' [37]. In the encyclical *Evangelium Vitae*, John Paul II states that a situation of this kind must not be seen as a covert form of euthanasia, but as a realistic 'acceptance of the human condition in relation to death' [37]. According to the new Catechism of the Catholic Church the patient's desire to die is not held to be a sufficient reason for abridging life, but in situations that are deemed objectively terminal, such desire must be taken into consideration. In situations of this kind, standard treatment cannot be withheld, but it is justifiable to discontinue an expensive 'persistent therapy' whose current and predicted results are out of proportion to the means applied [37].

Some difficulty clearly emerges here in conciliating the defence of life with the need not to interfere with other, by now broadly accepted, ethical principles, such as that of autonomy, of doing good, of not doing harm, and of the need for a fair allocation of resources. Nor can we turn a blind eye to the inroad on our consciences made by the problem of anticipating death, albeit in morally more acceptable forms, with the aim of sparing useless suffering.

Bases of ethics

What stance to take before the sacredness of life and the anguish of suffering as we approach the eve of the third millenium? This is the problem that most weightily imposes itself on our consciences.

The entire history of philosophy is interwoven with possible answers on ethics and the fundamental questions of life, but in the twentieth century, if we omit the neoscholastics (Maréchal, Maritain; Gemelli, in Italy), a large part of Western philosophy has eschewed metaphysics in the conviction that, by the very fact of its purely speculative nature, it will never lead to positive results. Metaphysics has given way to various streams of thought, some influenced by the achievements of science, others opposed to these, none of them really capable of replacing metaphysical ethics with fresh and elevated moral thinking.

Fifty years ago, in his *History of Western Philosophy* [38], Bertrand Russell, philosopher, mathematician, and Nobel prizewinner for literature, wrote: 'Ethics has made no progress in the sense of proven discoveries. Nothing in ethics is known in a scientific sense. There is thus no reason why a ancient treatise on the subject should be inferior to a modern one ...' In a very recent work, Frans de Waal, one of the world's leading primatologists, writes: '... we seem to be reaching the point at which we can snatch ethics from the grasp of the philosophers' [39].

In recent decades, neurobiologists, evolutionary biologists, and ethologists have laid the ground for an ethic based on rational foundations. According to Antonio Damasio, a leading neurobiologist working at the University of Iowa, ethics is underpinned by a

cerebral mechanism capable, in fractions of a second, of performing selection, from the repertory stored in the memory, of that behaviour that is associated with the maximum of pleasure/reward or with the minimum of suffering/punishment [40]. Cases are known of patients who, having sustained lesions of the ventromedial areas of the pre-frontal zones, remain normal as regards several other intellectual functions but lose the ability to behave according to an ethical standard which they formerly respected. Furthermore, individuals affected from birth with a strange condition known as 'congenital absence of pain' fail to achieve normal behaviour patterns.

How has this mechanism arisen? According to Damasio, it has arisen and evolved in time as a means of avoiding suffering in individuals whose ability to recall the past and predict the future had attained an appreciable development. 'In other words, it evolved in individuals capable of realising that their survival was threatened, or that it was possible to improve the quality of their lives' [40].

Human development and ethics

At birth, our brain is not a *tabula rasa*; but it is well known that the new-born is incapable of working out articulate thought, let alone of an ethical nature. Undoubtedly, during childhood and adolescence—thanks to the teaching of parents, elders and fellows, and under the influence of customs, conventions and religions—we pick up the acquired elements, (critical, educational), of our behaviour models. And the teaching influences the type of pairing 'behaviour/pleasure-reward' or 'behaviour/suffering-pain'; but the enrichment of this repertoire is a continual process that ends only with the cessation of life itself. Each person's culture and experience may alter the threshold at which the mechanism is set in motion, or modify its intensity, or afford the means to attenuate it, or, as we said earlier, may even alter its polarity of response; but its essence is given [40]. With the evolution of the species, and the development of coexistence in groups or societies, since the behaviours of every being concern not merely its singularity, in isolation, but the entire community, those behaviours have become integrated in order to obtain the maximum pairing with pleasure and well-being, and hence the maximum survival, of the communities, assimilated by species, sex, race, interests, nations, and religions.

Neurobiological theories call to mind the Epicurean philosophy, founded in the fourth century B.C. on observation of nature and the atomic theory of Democritus, and thus, erroneously, branded as a philosophy of hedonism. Epicurus desired to reform the customs of his time and to liberate man from the fear of the gods and the superstitions connected therewith, divinations, predictions, the belief in destiny. Such fears persist even today and give rise to much suffering, to which the faith in another world, the oriental philosophies, the thousand-and-one illusions peddled

by magicians, fortune-tellers, astrologers and the like offer mere palliatives.

If the scientific bases of ethics are those described up to this point—namely, an evolutionist, hereditary component and an acquired experimental, cultural component—the end towards which nature tends must therefore be the protection of life and the elimination of suffering. The protection of life is the primary objective, but when life can no longer be defended, when unbearable suffering is associated with a life without hope, the elimination of suffering may become the goal at which to aim. But who can calibrate the dimension of suffering if not the person who suffers? Here, then, is the affirmation of the principle of autonomy, which according to some also comprises the right to a dignified death.

Today, a lay ethics may be constructed on the basis of this scientific scenario, an ethics without revealed truths that leaves individual autonomy in charge of moral judgments and the practical conduct arising therefrom, and in which universal values are attained through common concurrence.

Metaphysical ethics and scientific ethics

The other scenario is the metaphysical one, with its revealed truths, appealing to our assent even in the affirmation of free will. A metaphysics integrated with a natural theology that aims to provide rational grounds for that metaphysics. But Christian metaphysics is founded on that of St Thomas Aquinas and medieval scholastic philosophy, deeply influenced as they were by the rediscovery of Aristotle's philosophy in the twelfth century. This metaphysics is underpinned by the Ptolemaic cosmology and the rudimentary scientific knowledge of the Middle Ages, limitations to which we can scarcely turn a blind eye on the brink of the third millennium.

In the view of the new philosophers, the theoretical physicists—largely determinists—it is possible to believe in a Being by whom the Universe is ordered; but, after the rules were established, He seems not to have intervened to alter them, for otherwise the laws of physics would lose all their validity. It is therefore unlikely that, billions of years after creating the Universe, God has wished to dictate rules binding humankind to conform. Einstein, originator of the theory of relativity, said that he believed in the 'God of Spinoza, who revealed Himself in the ordered harmony of what exists, not in a God who concerns Himself with the fates and actions of human beings' [41]. And it is indeed hard to think that God is concerned with the daily affairs of billions of selfish, quarrelsome, cruel human beings who inhabit one tiny planet among the hundreds of billions of solar systems of one of the forty billion galaxies of a universe that could be only one of an infinity of universes in space. Anyway—it has been said—who can read the mind of God?

Is only human life sacred?

One of the basic principles of Catholic ethics is the sanctity of life, which stems, indeed, from its divine beginnings and from the conception of man as 'made in the image and likeness of God'. In the *vitalist* conception the sanctity of life becomes, rather than one principle among others, the *sole* principle that counts, supplying a definitive, decisive criterion of application and admitting of no restrictions or exceptions [42].

According to Genesis 'God formed man of the dust of the ground, and breathed into his nostrils the breath of life'. But life is also an attribute of animals which, according to Christian tradition, have no soul. What makes man, and man alone, 'in the image and likeness of God' can therefore only be his ability to think, remember, elaborate, invent, choose, foresee the future, i.e. 'to have a mind'. But the human mind, as we said, is not born ready developed. It unfolds with ontogenesis and regresses to animal level, or worse, when its anatomical structure disintegrates under the effects of disease, such as Alzheimer's. Moreover, the structural basis of the human mind is, as we know, the outcome of an evolution of the species, which has several intermediate stages, and in many animals we can find evidence of 'mind', though less evolved than that of humankind.

Having no vocal chords, chimpanzees, gorillas and orang-utans have not featured the astonishing evolution of mind associated with the articulate use of language and the development of syntax, and the subsequent invention of writing [43]. If brought up in a human environment, however, they are capable of learning sign language, understanding it, using it and even teaching it to their young. The well-known philosopher and bioethicist Peter Singer reports [43] that a gorilla, named Koko, possesses a vocabulary of 1000 words and is able to understand many more, even in spoken English. Jane Goodall, ethologist, writes: '... anyone, like me, who had worked for long periods of time with chimpanzees would have no hesitation in affirming that they show similar, probably identical emotions to those of humans, like joy, sadness, fear, desperation and so on ... They are capable of making plans for the immediate future ... and clearly have some sort of idea of self'. As is well known, chimpanzees and humans differ by only 1.6% of their genes. Singer says further that it is highly likely that in the future it will be demonstrated that also whales, dolphins, elephants, dogs, pigs, non-anthropomorphic primates and other animals are conscious of their existence and able to reason [43].

Jean Heidelmann, chief astronomer at the Paris Observatory, reports: 'In the volcanic ash of Tanzania, dating back 3.5 million years, the footprints have been found of *Australopithecus*, our ancestor who invented the erect posture. There are two types of prints: on the right, those of two adults—the female is careful to leave hers behind those of the male—and beside them,

on the left, those of the child, whose steps are almost as great as those of the parents. It is already trying to imitate them: a characteristically human trait that cannot leave anyone indifferent and that, along with others, explains humanity's progress in the course of evolution' [44]. Can one continue to maintain that, among all the animals, only the life of humans is sacred?

Scientific ethics and soul

And the soul? What place in this picture for the 'vital afflatus', 'the motor of life', the 'reason underlying the higher human faculties'? If the soul is identified with the mind, and the latter with the activity of the myriad particular, highly specialized cells that we call neurones, then every form of life, every being able to develop neural networks possesses a fraction of soul. If soul is mind, and mind inhabits the brain, then along with the brain and the body the soul must also die. At which point, nothing remains.

Thus we are denied the great consolation of religions, the immortality of the soul, its exit from the body and possible transmigration into other bodies, the eternal survival of our spirit, the reuniting of our souls in a Beyond, the hope in a better, juster, future life, the reward for earthly sufferings and the punishment for sins. Therefore, if suffering that redeems and prepares the reward in another life is a mere illusion, why prolong suffering when life has become devoid of all hope?

A shared ethics

But however profound the doubts raised by the conquests of science, the great majority of humankind plainly has need of God.

Paul Davies, professor of mathematical physics at the University of Adelaide, unbeliever, admits that science and faith inhabit different orbits: 'I was astonished to discover how many of my close scientific colleagues practice a conventional religion. In some cases they manage to keep these two aspects of their lives separate, as if science rules six days a week, and religion on Sunday' [45]. And Steven Weinberg, Nobel prizewinner for physics, also unbeliever, says: 'I have to admit that sometimes nature seems more beautiful than strictly necessary' [46].

Many of the teachings of all religions undoubtedly possess a great ethical value. They reflect deep-rooted needs indispensable to control and regulate human drives that, if left to themselves, tend towards chaos. If not revealed truths, they are surely the result of thought and reflection through time—a long and variegated experience that, over thousands of years, has shaped the bases of our consciousness and our ethics. If we turn our backs on these teachings, it will only be at the risk of a grave decay of our civilization. Values such as the defence of life, the principles of equality

and fraternity, the principles of charity and solidarity, human dignity, the rights of the weakest, even the respect for property, heritage of Christian ethics and many other religions—all these are by now the underpinnings of our civil coexistence. Such principles are, indeed, largely shared by lay ethics, but the intransigent defence by believers of revealed truths and the sacredness of human life still leads to fierce conflicts, though some changes are beginning to emerge. The Church shows wisdom in acknowledging, even if very belatedly, the physical laws of the Universe and the theory of evolution, effectively renouncing Genesis; as it does when it timidly gives up the dogmatic defence of life and accepts, for example, that last-ditch treatments like dialysis may be discontinued when their results fall short of expectations, though fully aware that withdrawal must lead to death before natural term.

The next step for us, even if we are believers, is to acknowledge the right to independent judgment of the value and significance of life, without the anguish of heresy and eternal damnation. Lay persons, on their side, must understand that a large majority of humankind suffers from a grave cultural lag: in minds not educated to ethical principles, relativism, pragmatism and utilitarianism, however rational, may lead to an emphasis of selfishness, with a concomitant attenuation of the moral sense and of respect for the 'other'.

Today, it is neither reasonable nor just to barricade oneself within one or the other of the two ethical positions, the religious and the lay. It should not be impossible for us to meet halfway. For only in this way will it be possible to discover an easier solution to the presently intractable ethical problems posed by our discipline: defence of life, to be sure, but non-dogmatic and with respect for individual autonomy and the inescapable demands of society; strong commitment to the physical health of the patient, jointly with mental well-being, but firm opposition to therapeutic obstinacy; loving understanding of real suffering and profound commitment towards its elimination, to the extreme but rational consequences of such commitment. If consciousness is the fruit of the perception of our mental activity, and thence of our education and culture, in the future the advancement of culture offers the only way to improve it, to draw together different consciousnesses, and to enable us to aim at common and higher ethical goals.

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