Nuclear medicine in developing countries

A report from an Argentine perspective

by
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The economic crisis through which developing countries are passing, especially those that are feeling the effects of foreign debt and inflation, means that every field of endeavour must adapt to new realities imposed by each particular's country's situation. Public health is no exception, although it is obviously a priority field in view of the repercussions which social and economic phenomena can have on the health of a country's inhabitants. Here we find ourselves confronted with a paradox: the more it becomes necessary to attend to the health of a needy population, the scarcer the available resources for the purpose.

As the economic situation of a country gradually deteriorates, one of the first steps taken is a re-allocation of resources to concentrate them in priority areas. In the case of public health, resources are needed first for the initial care of patients, which in itself reduces spending for high technology areas.

We have seen how nuclear medicine, like other special fields which rely on advanced technology, has been held up in the development and introduction of new techniques. The need for sophisticated equipment, imported drugs, and expensive laboratory materials has had a serious effect on research, as indeed it has on practical therapy, too. Research workers and specialists are making enormous efforts to keep up with advances in science, but the sacrifices required to maintain up-to-date knowledge are becoming more and more difficult, and the lack of ready resources is also becoming worse with time.

What, then, should we do? What proposals can we put forward in the area of nuclear medicine with a view to alleviating the situation, so that research can continue, teaching can be improved, and adequate treatment can be offered to patients, so that our doctors, research workers, and technicians do not find themselves out of touch with the state-of-the-art in their own field?

Medical diagnosis and treatment

As to the practical assistance which nuclear medicine can offer, an effort should be made to focus on tasks shown to be of genuine value in light of cost-benefit analysis — tasks for which nuclear medicine cannot be replaced by other less costly techniques which provide similar information. Quite frequently, certain methods in medicine, once they have been developed, are continued indefinitely without periodic evaluations to determine whether they have not in fact been overtaken by other techniques. For this reason, it is particularly important to revise periodically the list of services offered by a medical installation and to suspend those studies or types of therapy which are no longer bringing any real benefit to patients.

In order to reduce the cost of medical services as much as possible, most studies should be carried out with drugs that do not have to be imported, certainly as long as the economic crisis continues. Technetium generators can be used for many of the studies required in nuclear medicine and should be used as efficiently as possible. In particular, patients should be

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examined as early as possible, before the radioactivity of the isotope has decayed substantially. Examinations could be distributed over a number of laboratories, provided the standards for the transport of radioactive materials are respected (licenses required from the Advisory Council on Radioisotope Applications).

The care of patients will vary depending on whether they are located in densely populated urban areas or in the country. In urban areas, laboratories should preferably be set up in conjunction with sophisticated, modern medical centres that have in-patients. These centres should have a gamma camera and appropriate recording equipment. If a rotary camera is used, the staff should include a physicist who can carry out quality-control studies.

In rural areas, linear scintillation equipment and associated recording circuitry are sufficient. When patients require more sophisticated methods for diagnostic processes, they should be transferred to larger, better endowed centres.

In general, the location of laboratories is haphazard, largely because they were established without adequate planning geared to the needs of the population. Rather, they simply grew up in response to the interests of doctors and research workers. We sometimes see nuclear medicine services duplicated or located in areas where population density does not justify it.

When a laboratory is located in a region of low population density, some professional workers may be tempted to carry out unnecessary studies in the belief that they are thereby amortizing the maintenance costs of their equipment and the cost of the drugs. For the patients, this not only means that medical costs are increased but also that they are involuntarily subjected to bad medical practice.

To avoid these undesirable effects, public health authorities, in co-operation with the National Atomic Energy Commission (CNEA), should plan the distribution of laboratories as a function of the needs of the community, either authorizing the installation of a new facility or rejecting it in accordance with the genuine requirements of the public at large. For this purpose, it would be useful to carry out a study that would yield more or less exact information about the number of existing laboratories, their geographical location, the types of service they offer, the equipment and personnel available to them, etc.

In connection with medical treatment, we must emphasize how important it is that public health authorities should be involved, in close co-operation with CNEA and the competent scientific associations, in all matters entailing the medical uses of radioisotopes. To give practical effect to this integrated approach, it would be wise to reactivate the Joint Commission consisting of officials of the Ministry of Health and Social Action and the National Atomic Energy Commission, to deal with matters of nuclear medicine and radiotherapy; at the same time, the operational standards for nuclear medicine units should be effectively applied (Decree No.3377/80).

Among the Commission's functions would be advice regarding the issuance of specialists' certificates; issuance of licenses for establishment of new laboratories; issuance of licenses for the import of new equipment; authorization for the use of new radiopharmaceuticals; standardization of nuclear medicine procedures; and validation of methods which are to be incorporated in the national nomenclature.

A hospital technician does a radioimmunoassay test in a clinical laboratory. (Credit: NEN)

Research

Here we have to take into account first the economic possibilities for the development of research, making a careful study of the personnel involved, the equipment and materials to be used, the time required for projects, and other factors. Obviously special priority must be given, in these times of crisis, to subjects of national interest.

Many forms of assistance — including funds obtained through subsidies, fellowships, internal and/or foreign agreements, support for research from public or private institutions, foundations, and other sources — in many cases would make it possible to avoid interrupting research even when the economic situation is difficult. This type of support is often relied upon even in economically advanced countries, and it becomes a matter of first priority in coun-

tries where resources have to be focused on really pressing needs.

Recently, it has been possible to discern not only a falling off of research work in our own region, but also a significant loss of quality in the projects carried out, most of which are now merely repeating experimental work already done in other countries. This is partly due to the familiar lack of resources, but also to the fact that research workers simply do not have the leisure to design original work. The hectic life which they now lead is, in turn, due to the overpowering constraints of the social and economic situation.

Proof for this viewpoint can be seen in the success achieved by local research workers operating in various countries of the world where economic and political stability has enabled them to get on with their research without distractions.

Our own research workers are observing, moreover, how their isolation from the rest of the international scientific community is gradually becoming worse. This is a consequence of lack of information (journals, publications, or documents), and of the practical impossibility of attendance at meetings, symposia, or congresses that in fact constitutes an essential task for any research worker. In nuclear medicine, research should be directed towards the development of new techniques. One of the main aims is to avoid the use of imported drugs as long as the economic problem persists.

Research plans should take due account of regional disease — for example, in Argentina, Chagas' disease, endemic goitre, and nutritional anaemia, among others. This does not mean that the research work already in progress necessarily needs to be suspended. It simply means that new projects of national interest should be given special encouragement; in particular, more support should be given to research workers operating in the interior of the country who are taking part in provincial programmes under the supervision and with the support of the CNEA authorities.

Teaching

Teaching activity so far has been oriented largely towards courses for specialists and technicians, including radioimmunoassay courses. It will also have to be adapted to the new situation in view of the difficulties through which the teaching profession is now inevitably passing. Assignments to these courses will have to be limited and applicants carefully evaluated. The course for technicians should embrace every subject related to diagnosis by means of images — radiology, computer tomography, pulse-echo techniques, nuclear magnetic resonance, and other techniques available in nuclear medicine. In this way, participants will be in a better position to find useful employment upon completion of their course.

The programmes for these courses should be designed by professors of the competent departments at the University of Buenos Aires and by officials of the CNEA, and should be subject to approval by the Advisory Council on Radioisotope Applications.

New modalities of action

In conclusion, we can state that our own special field, like others employing advanced technology, must now be adapted to new modalities of action in keeping with the situation prevailing in our countries. The situation is novel, indeed quite unknown during the last few decades: it combines the effects of foreign debt and inflation in the developing countries, in stark contrast to the extraordinary advances of science in the economically advanced countries, and thus makes it difficult for us to share those achievements.

In the particular case of nuclear medicine, the introduction of single photon emission computer tomography (SPECT) and positron emission tomography (PET) has revolutionized science. They make it possible to develop new techniques and to gain a thorough understanding of the intrinsic mechanisms underlying the metabolism of numerous diseases, and of their evolution and treatment. All this represents a challenge which we cannot evade in modern times. On the contrary, it is absolutely essential to create conditions in which highly sophisticated institutes employing renowned specialists can pursue their research at the same level as in advanced countries. Chances of maintaining the scientific hierarchy and adequate medical care are bound to depend on improvements in the general situation of countries in the Latin American region.

The authorities, both CNEA and public health authorities, will have to establish the guidelines and the general orientation needed to achieve our objectives, even in the face of economic crisis.