

Improving Penetrance of Nuclear Medicine in India: Prospective Approaches to Reductions in Immediate Capital Requirement

The field of nuclear medicine has been maturing at a rapid pace, as positron-emission tomography/computed tomography (PET/CT), gamma imaging, and single-photon emission tomography (SPECT)/CT are being incorporated into multiple clinical guidelines for both oncological and nononcological indications. Still, wide-scale adoption of these modalities has been limited in our country as most nuclear medicine centers are concentrated in larger cities and hospitals.^[1,2] This has forced clinicians to either refer patients to distant centers for imaging or seek alternative modalities, even when they are inferior in given clinical indications.^[2] Higher input capital requirement at the stage of setting up a nuclear medicine facility is one of the major reasons for a limited number of centers. Even the medical colleges in most states, either do not have any nuclear medicine facility or in a very few instances, where they do have the same, it is composed of a single gamma camera, with even fewer having SPECT facilities. Furthermore, the relatively higher (and regular) requirement of consumables such as generators and radiotracers often makes it untenable for the hospitals with a limited budget to run a nuclear medicine facility. Even in developed countries, the operating expense per procedure for nuclear medicine is usually much higher than for CT.^[3] In context of the present pandemic and its influence on the administrative policymaking, we expect increasing allocation of the budget to the preventive and community health aspect of the medicine. This was evident in the recent national budget. Therefore, we need to brainstorm a few methods to reduce the immediate capital requirement and in process improve the economic viability and the penetrance of the field in the country.

There is little, if anything, which can be done to reduce the costs of the machines and the radiotracers. In contrast, with increasing technological advances and research-related expenditure, these costs are expected to increase with time. Therefore, considering the capital requirement to be an immutable factor, we have to think of ways to either divide the cost over time or share the cost with other parties.

So, how can we divide the capital over time? Here, we can draw on from experiences in automotive and defense industries. Often, technology with high input costs can be leased from the manufacturer or a vendor. This is particularly attractive in a technology-intensive and driven field such as nuclear medicine. If we consider the functioning lifetime of a PET or a SPECT scanner to be 10 years, the machines will become obsolete in a decade on account of advancements in the processing power and software alone, even if no significant advancements are

made in the field of detectors or electronics. This is one of the major reasons that these machines do not fetch even a tenth of their cost when they are resold. Hence, there is little impetus in owning a machine, except in rare cases like a research center working on the camera-related technologies. Leasing can also help in the easier assessment of annual expenditure and can allow centers to acquire relatively advanced technology. The latter can be understood by analyzing the current model, where scanners are acquired on the basis of the lowest bid. In “lease” scenario, a center may opt for a more expensive machine such as a CZT camera and justify the excess expenditure in terms of savings on account of increased efficiency and reduced requirement of radiotracers.^[4] In addition, radiation dose to the patient can be substantially reduced.

Second approach to reducing the capital requirement is cost sharing. This is a particularly attractive prospect, as there are many instances of the successful public–private partnerships in the health industry, and administrative guidelines have been issued in this regard.^[5] For example, many hospitals (both public and private) have outsourced the entities such as X-ray machines and CT scanners to private players, who install, run, and maintain the machines on the hospital premises and are often paid on per-patient basis. This also “outsources” the headaches in terms of maintenance issues and scanner downtimes since the “partner” too has an interest in smooth running of the whole operation. In addition, supply of relevant radiotracers can also be included in the initial contract, as the manufacturer/vendor/contractor can be paid on per-patient basis. The only additional expenditure that the hospital has to incur is in terms of medical expertise and human capital. This is an attractive prospect to the private player as well because they do not have to incur the costs of the infrastructure and land. In addition, in public sector, some concessions like in tax can also be negotiated with the government to further reduce the costs. Similar model has worked for “private-private” partnerships too. This approach as with the one described previously frees up the hospital from the shackles of lowest bid contracts, as better technology can be sought with a holistic analysis of per-patient expenditure, rather than buying all individual components at the lowest bid, where the output in clinical context is often less than the sum of individual components. The calculations in terms of per-patient expenditure can also help the administration address the complications arising out of the “price matching” approach, wherein a vendor may be asked to match the price of similar equipment in another public institution, even a few years after the acquisition of the older equipment. This is because the

calculations in regard to inflation can be easily incorporated in the subsequent bids to justify the increase in the costs. It also allows for accurate calculations and budgeting of the payment exemptions and insurance provided by the government to the poor patients, on both prospective basis and retrospective basis, and therefore can aid in policymaking. Finally, because the hospitals do not own these machines, they can easily negotiate the upgradation of older equipment/requirement of more or better resources such as newer/more powerful workstations and softwares, at a later time, rather than depending on long-term theoretical projections at the time of acquisition. This also contributes to maintaining a technological competency.

Finally, these approaches can unlock the potential of these “partnerships” in other domains such as research, where the combination of the large amount of anonymized patient data and clinical expertise at the disposal of the government hospitals with the engineering expertise of the private sector can be used to create proprietary softwares such as neural databases for Indian populations and other patents, which, in turn, can be a source of additional revenue for both entities.

There are many working examples of these approaches in both public and private hospitals. Therefore, we can draw on from their experience in working out the framework for our field. In our view, these approaches can provide the field of nuclear medicine, the required push for its universal adoption, especially in second- and third-tier cities.

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