THE EARLY MEDICAL RESPONSE TO THE GOIÂNIA ACCIDENT

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Abstract

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The Goiânia accident was the most severe radiological one that ever happened in the western hemisphere. The response to its human, social, environmental, economical and psychological burdens represented a huge challenge. Thanks to a multi-institutional intervention the consequences of the accident were greatly minimised. The medical response followed the same pattern and was based on a three-level system of progressive assistance.

The early medical response encompassed medical and "radiological" triage, admission to a specially prepared ward of a local hospital and treatment at a reference center in Rio de Janeiro.

1. INTRODUCTION

The use of technology brings together risks to human beings and to the environment as a whole. Risk has become an important subject of discussion and uneasiness [1].

Industrial risk is not confined within the limits of an industrial plant, so that public concern include not only ionising radiation, but also asbestos, chemical and non-ionising radiation, as microwaves and electromagnetic fields [2-3].

The preparedness to respond to major accidents either natural or industrial, must take into account the public perspective too and radiation is such a good example. Indeed, this represents a real challenge, even in developed countries[4], as it has been demonstrated in many circumstances[5]

Although immediate deaths in Chernobyl and in Goiânia were modest if compared to Bhopal and San Carlo de la Repita[5], for instance, the immediate and late consequences of those accidents were greatly increased in the public judgement, making the medical and general responses even more difficult.

The description of the accident can be found elsewhere[6-7], but it is worth mentioning that as the 50.8 Tbq 137-Cs source was dismantled and minute fragments were distributed to several individuals and families, a significant number of persons were affected. From 13 to 28 September 1987 112,800 persons were triaged by the medical and radiological teams at a football (soccer) stadium. Table I summarises the immediate medical impact.

TABLE I. THE IMMEDIATE MEDICAL IMPACT

Medical and radiological triage	112,800
Internal/external contamination	129
Hospital admission	20
Acute radiation syndrome (death)	8 (4)

2. THE EARLY MEDICAL RESPONSE

As soon as the accident was recognised by the Brazilian National Nuclear Energy Commission (CNEN) a number of professionals were summoned to Goiânia (most with CNEN, FURNAS — the largest Brazilian power utility and the Navy). Three of them were physicians specialising in Radiation Medicine whose immediate tasks were to triage victims, to deliver first aid and conventional therapy and to decontaminate, both internally and externally. This mission was accomplished on a round the clock basis and very difficult, not only because at the magnitude of the emergency, but also in virtue of a strike of health personnel in Goiânia. Besides, "radiophobia" precluded any initial help to the attending physicians. The severity of some medical conditions and associated psychological disturbances were additional difficulties[8-9-10].

The medical response was based on a three-level system in accordance to the standard "Facilities and Medical Care for On-Site Nuclear Power Plant Radiological Emergencies" by the American Nuclear Society[11] that is adopted by FURNAS at its Angra dos Reis Nuclear Power Plant.

Medical care was delivered at each of the levels in accordance to the severity of the skin injuries, the contamination burden and the degree of bone marrow depression, as next described.

a) The FIRST LEVEL took place at the OLYMPIC STADIUM in Goiânia and consisted of the medical evaluation of the victims, considering their triage and reference to another level of assistance. In such a way, not only the observation of local (skin) injuries and external counting through portable monitors were useful tools, but also the existence of any of the prodomal manifestations of the acute radiation syndrome — ARS (nausea, vomiting, anorexia, etc.). Also clinical and laboratory findings, like alopecia and low blood counts, helped in determining the destiny of the patients.

Those with external contamination were decontaminated using neutral warm water lavage with neutral soap. Reassurance of individuals with minor or no exposure or contamination was a procedure at this level.

An extension of the first level was the INSTITUTE FOR THE PROTECTION OF MINORS (FEBEM), used on an out-patient basis for those who had had only minor external or internal contamination, but who had their houses interdicted, adding a social character to this level.

b) The SECOND LEVEL occurred at the GOIÂNIA GENERAL HOSPITAL – GGH where a special ward was prepared with contamination control. Immediately the location was divided into a "free area" (no contamination expected), a "supervised area" (a radiation control point) and a "controlled area", were patients were admitted.

During September 30 and the dawn of the next day the three physicians in charge re-evaluated the patients at HGG. Six of them were selected and removed by air on October 1 to MARCILIO DIAS NAVAL HOSPITAL – MDNH in Rio de Janeiro, accompanied by one of the doctors. These patients were elected for removal in virtue of the severity of local lesions, the ARS manifestations and in one case because of probable massive internal contamination, confirmed later[12].

c) As aforementioned, victims with the most severe conditions were referred to MDNH (THIRD LEVEL). Both in GGH and MDNH treatment focused on local injuries (topical creams, use of analgesics and opiates, debridement and surgery at a later stage), on the ARS and different degrees of bone marrow depression (reverse isolation, gut sterilisation,

prophylactic and curative antibiotics, blood and derivates transfusions — as platelets concentrates and the use of a bone marrow stimulant factor — GM-CSF[13]) and also on the decorporation of caesium with the use of Prussian Blue[6-7-9-10].

One patient had his right forearm amputated at MDNH in a life saving procedure.

3. CONCLUSIONS

Although not producing a large immediate death toll, the Goiânia misadventure caused a very impressive public impact, in virtue of its social, economical, ambiental and political aspects too.

The accident highlighted the need for well designed plans to respond to mass disasters of any kind. The implementation of a medical response in Goiânia based on a three level system was an important factor in mitigating the consequences of the casualty. This was one of the reasons why the University of the State of Rio de Janeiro and its Laboratory of Radiological Sciences – LSR have recently submitted to the Brazilian Health Ministry a similar medical plan to be triggered in radiation emergencies. This plan has been approved and is to be implemented on a nation-wide basis.

The continuous training of emergency personnel on radiation issues is one of LSR`s goals "Radiophobia" was an important initial mishap in Goiânia and this kind of problem can only be overcome by means of education and training.

Medically, many lessons stemmed from the Goiânia experience14. Amongst them, the unique large use of Prussian Blue and its comprobatory effect in decorporating caesium. Also the first administration of GM–CSF in a radiation accident can be mentioned although its use in a late stage of the bone marrow depression precluded any conclusion of its effectiveness in that occasion.

Finally, it must be stressed how valuable the multi-institutional and international participation was, the latter consisting of medical advising, parallel laboratory testing and the supply of special drugs such as GM–CSF.

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