Integrated Telemedicine by Satellite for Cancer diseases prevention and monitoring

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Multidisciplinary approaches in cancer research and treatments in general are useful methods in order to verify several influences on the aetiology and epidemiology of disease (as genetic predisposition, environmental factors, infectious agents, lifestyle, ethnicity, etc.). They need the integration of biomedical information and knowledge (clinical data bases, epidemiological registries, virtual bio-banks, etc.), collected during the diagnostic and therapeutic process of care. Monitoring in real time health parameters before and during the evolution of disease is another important aspect.
In multidisciplinary approaches is necessary to aggregate large and complex volumes of data and images present in several medical records (available in hospitals, outpatient clinics, etc.) and the use of robust ICT (Information and Communication Technology), based even on satellite communications for wide geographical monitoring, is recommended (in particular health information systems and telemedicine services).
Moreover for better prevention and treatments of cancer diseases it's important to collect and continuously to update more information related to different risk factors as demographic, epidemiologic, genetic and environmental data at territorial level (in particular of developing countries, as in Africa, Asia, South America, and so on).
For these reasons integrated information systems based on cancer registries and telemedicine services are very useful. They consist of several tools such as: data and images storage and management, data retrieval and queries, statistical software for data analysis and mining, knowledge base and expert systems with appropriated ontology, etc.
Telemedicine and teletraining services are important for monitoring and helping patients at distance points of care (i.e. remote villages or health districts of developing countries where the communication can be only satellite based). In particular in cancer diseases a role is done by teleradiology and telepathology for consultations based on images (radiographies and histological glasses).
Most of data regard risk factor exposures (chemical, biological and physical elements, tobacco and alcohol use, sexual behaviour, etc.), patient medical history, genetic information, preparation of paraffin-embedded tissue blocks for in situ proteomics via tissue microarray technology, synoptic reports, histological and surgical reports, etc. This diversified type of data, including clinical and follow-up data, will be collected in the information system of cancer registry and will be stored into the databases by using common web-based tools.
So the integrated system based on epidemiological registries and telemedicine services could be used in a dynamic manner to support studies, researches and clinical practices even during the therapeutic and diagnostic process and follow up of cancer patients. In this new approach the registry (as a systematic set of different data relating cancer diseases) not only will encompass clinical and epidemiological data (as medical history, anamneses, diagnosis or mortality ICDO – International Classification of Diseases Oncology - codes); but also, by means of virtual bio-repositories (biosamples availability), it will be possible to facilitate the identification of cancer inducing factors by virtue of the high throughput and massive technology available in the laboratories of the hospitals and biolaboratories (e.g.: DNA screening, wide RNA and microRNA expression, in situ proteomics, methylation screening and tissue microarrays for validation purposes).

In conclusion integrated information systems and dynamic cancer registries can facilitate several activities as: data management of electronic medical charts and patient questionnaires, of observational studies and clinical trials; virtually biorepository management; aggregation of clinical annotations from Medical Records and Hospital Information Systems; web query for requesting of biospecimens and/or derivatives; telemedicine services for diagnostic support (i.e. teleradiology and/or tele-pathology) and for tele-training and e-learning activities.