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TECHNICAL NOTE

Telemedicine: Potential applications in epidemic situations



Télémédecine : applications potentielles en situations épidémiques

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Summary

Background. — Telemedicine has several applications regarding different medical specialties or clinical situations. However, telemedicine as a potential tool during epidemics is not as well considered.

Methods. — In this paper, the application of telemedicine is conceptualised using five possible evidence-based epidemic situations.

Results. — The first situation corresponds to asymptomatic individuals, mainly home-based, living in an epidemic-affected location. The application of telemedicine would be through the use of teleconsultation for emergency medical dispatching and would occur when suspicious symptoms are detected by an individual. The second situation for the application of telemedicine is principally home-based and corresponds to the follow-up telemonitoring of asymptomatic individuals identified as case contacts. Concrete applications of these concepts were used during the Ebola virus disease outbreak in Africa since 2014. The third situation links to symptomatic cases in need of isolation. Examples include patients isolated in Taiwan during SARS epidemic in 2003 and H1N1 pandemic influenza in 2009, as well as H7N9 influenza infected patients in 2013 in China. The fourth situation involves tele-expertise when local medical resources do not have the technical expertise for the diagnosis or treatment of a patient and support is required from reference centres. The fifth situation corresponds to a healthcare facility under quarantine that would use telemedicine to keep taking care of patients that cannot access the facility, as it was the case in June 2015 in Seoul during the Middle East Respiratory Syndrome Coronavirus epidemic.

Conclusion. — The use of telemedicine in epidemic situations has a high potential in improving epidemiological investigations, disease control, and clinical case management. However, since

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it is a recent application, further research would be needed to gain an improved understanding of how telemedicine could be applied in epidemic situations.

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MOTS CLÉS

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Cas groupé ;
Contrôle ;
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Résumé

Contexte. – La télémédecine a de nombreuses applications selon les spécialités médicales et les situations cliniques. Cependant, la télémédecine comme potentiel outil en situations épidémiques a été peu considérée jusqu'à présent.

Méthodes. – Dans cet article, l'utilisation de la télémédecine en cas d'épidémies a été conceptualisée en fonction de cinq situations épidémiques différentes fondées sur les faits.

Résultats. – La première situation correspond au cas où la téléconsultation est utilisée avec une personne asymptomatique vivant à domicile dans une logique de régulation médicale d'urgence. La deuxième situation épidémique concerne l'utilisation de la télésurveillance pour le suivi régulier des personnes identifiées comme contacts de cas. De nombreuses applications mettant en pratique ces concepts ont été utilisées lors de l'épidémie de maladie à virus Ebola en Afrique depuis 2014. La troisième situation est en lien avec la nécessité d'isolation de patients malades et la réalisation de téléconsultations. Ce fut utilisé notamment à Taiwan en 2003 lors de l'épidémie de SRAS et en 2009 lors de la pandémie grippale à virus influenza H1N1, ainsi qu'en Chine en 2013 pour des patients infectés par le virus influenza H7N9. La quatrième utilisation est la télé-expertise au cas où les ressources médicales locales ont besoin d'un support extérieur et d'une aide technique pour le diagnostic ou la prise en charge d'un patient. La cinquième situation correspond au cas où un établissement de santé serait en quarantaine et pourrait utiliser la télémédecine pour continuer à prendre en charge les patients ne pouvant accéder à l'établissement, comme ce fût le cas en juin 2015 à Séoul pendant l'épidémie de Coronavirus du Syndrome Respiratoire du Moyen-Orient.

Conclusion. – L'utilisation de la télémédecine lors de situations épidémiques a un intérêt pour améliorer les investigations épidémiologiques, le contrôle de la maladie, et la gestion médicale des cas. Cependant, cette application de la télémédecine étant récente, des recherches supplémentaires seraient nécessaires afin d'obtenir une meilleure compréhension de la façon dont la télémédecine pourrait être utilisée en cas d'épidémie.

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Telemedicine is often regarded as a way to improve the management of chronic diseases [1,2] and assist emergency medicine [3,4]. However, using telemedicine as a potential tool during epidemics is not as well considered. The objective of this paper is to conceptualize the use of telemedicine during epidemics using five possible evidence-based situations and associated concrete examples.

The first situation corresponds to asymptomatic individuals, mainly home-based, living in an epidemic-affected location. The application of telemedicine would be through the use of teleconsultation with a remote medical service. The primary role of the application would be emergency medical dispatching and would occur when suspicious symptoms are detected by an individual. Teleconsultation would be conducted using text, audio and/or video and would allow a personal risk assessment to determine whether the patient has a matched case definition or not. When symptoms match with the case definition, a secured transport would be issued and sent to the patient's location in order to safely transfer the patient to a referral treatment centre. When symptoms do not match with the case definition, the patient may be advised to seek a primary care physician.

In 2014, during the Ebola virus disease (EVD) outbreak, the Ministry of Health in Guinea set a National Ebola Hotline to respond to public health concerns and facilitate the referral of suspected cases to the isolation ward at Donka hospital in Conakry [5,6]. Similar hotlines were set up in Liberia [7] and Sierra Leone as well [8]. Furthermore, teleconsultation has been used in West Africa through a free telemedicine mobile application allowing people to send free text messages to seek medical advice [9,10]. Doctors for this initiative were based in Indonesia and Nigeria and once symptoms were matched with case definitions, patients were advised to seek medical treatment. From October 2014 to May 2015 included, 6063 live chats concerning Ebola occurred, with 20 suspicious cases detected.

The second epidemic situation for the application of telemedicine is principally home-based and corresponds to the follow-up monitoring of asymptomatic individuals identified as case contacts. Telemonitoring is managed through an auto-administered or hetero-administered online/mobile based questionnaire system. Collected medical data are then sent to a contact tracing centre. This system could

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