



Stem cell tourism – A web-based analysis of clinical services available to international travellers



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Summary *Background:* Stem cell therapies are advertised through online resources which describe a range of treatments with diverse clinical indications. Stem cell tourists may not be aware of the information they should seek when consulting these clinics, or of the potential risks involved. The aim of this study was to characterise the therapies offered by online stem cell clinics.

Methods: A web based search utilising five search terms was employed. The first twenty pages of each search result were screened against 340 variables.

Results: 224 out of 1091 websites advertised stem cell clinics. 68 eligible sites covering 21 countries were evaluated. The top five clinical indications for stem cell therapy were multiple sclerosis, anti-ageing, Parkinson's disease, stroke and spinal cord injury. Adult, autologous stem cells were the most commonly utilised stem cell, and these were frequently sourced from bone marrow and adipose tissue and administered intravenously. Thirty-four per cent of sites mentioned the number of patients treated while one quarter of clinics provided outcome data. Twenty-nine per cent of clinics had an internationally recognised accreditation. Fifteen per cent of clinics stated that their therapies posed no risk. Eighty-eight per cent of clinics claimed treatment effectiveness, with 16% describing their curative potential. Over 40% of sites did not specify the number or duration of treatments. Fifty-three per cent of clinics requested access to patients' medical records, and 12% recommended patients discuss the proposed therapy with their doctor. No clinic recommended that travellers consult a travel medicine specialist or receive vaccinations prior to their intended travel. One quarter of sites discussed contraindications to treatment, with 41% of sites detailing follow up patient care.

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Conclusions: There is potential for stem cell tourists to receive misleading or deficient information from online stem cell clinics. Both the stem cell tourist and travel medicine practitioner should be educated on the potential risks associated with stem cell clinical services advertised online.

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1. Introduction

Medical tourism is the term commonly used to describe the process that involves patients leaving their country of residence with the intent of accessing medical care [1]. Medical tourism is a global, multi-billion dollar industry that is predicted to grow exponentially in the next five-ten years [2]. This expected growth is being facilitated by increased use of the internet allied with the ubiquitous nature of accessible, low cost air travel. Patients are employing the internet to identify interventions that are not available or are too expensive in their home countries and travelling abroad to access these treatments [3]. Studies utilising different definitions and methods have estimated that there are between 60,000 and 750,000 medical tourists annually from around the world [4].

Stem cell tourism is a growing subset of medical tourism [5]. Stem cell therapy presents a realm of novel therapeutic possibilities for both patients and clinicians. Currently, stem cells are established as therapeutic agents in the treatment of haematological disorders including leukaemia, lymphoma and graft versus host disease. Stem cells derived from bone marrow are most commonly used in these treatments. The available evidence base for stem cell therapy is expanding. An outline of evidence-based clinical indications, risks and methods of stem cell therapy is provided by the International Society for Stem Cell Research [6]. A number of further uses for stem cells are under investigation. Many of these therapies are awaiting successful completion of approved clinical trials culminating in phase 3 pivotal trials [7]. There are currently 2000 stem cell trials underway globally and while the potential efficacy is enormous the outcome of rigorously conducted phase is still awaited.

Despite a lack of clinical data or appropriately designed clinical trials, demand for stem cell therapy is growing [8] with many patients travelling to avail of stem cell therapies through clinics represented on the internet [9]. Online clinics describe a vast array of treatments with a diverse range of indications, making them potentially relevant for a substantial portion of the world's population [9,10]. The provision of stem cell therapies in such an unregulated online environment offers a substantial potential risk to the health of stem cell tourists. This practice also undermines the credibility of legitimate stem cell research and the continued development of this promising branch of medicine.

Patients are employing the services of online stem cell providers, regardless of the experimental nature of treatments and the lack of accreditation and outcome data provided [11,12]. There is a lack of understanding of the

difference between experimental medicine and approved therapeutic products. The services provided by online clinics enable clients to avail of stem cell therapies, thereby facilitating them in their quest to overcome the delay imposed by protracted clinical trials. This represents a fundamental problem and has led to stem cell tourism becoming the object of intense scrutiny in recent years, with rising ethical concerns and reports of baseless claims and adverse events [10,13,14]. Examination of the literature in this field yields evidence of a brain tumour following neural stem cell transplantation [15], and also the development of renal angiomyeloproliferative lesions following autologous stem cell therapy [16].

In addition to the risk of experimental therapies, many stem cell tourists are travelling to countries with endemic risks of infectious disease transmission and substantially higher rates of healthcare associated infections [17]. This travel is frequently undertaken without adequate consultation from healthcare professionals [18]. In many instances, the patient population seeking stem cell interventions overseas is affected by underlying debilitating conditions and frequently has medical co-morbidities [3]. These patients are placing themselves at the dual risk of receiving an unproven treatment, coupled with the risk of travelling to a new country without receiving the recommended pre-travel health advice or travel vaccinations. Furthermore, many of the countries that cater for stem cell tourism have a high prevalence of multi-drug resistant organisms [17]. This process is also being facilitated by the increasing number of medical tourists originating from developing countries who are travelling to more developed countries to procure higher quality medical treatments [19].

Stem cell therapy represents a developing branch of travel medicine. There is a need to equip travel medicine practitioners with the requisite knowledge and resources to ensure patient safety. The aim of this study was to explore the representation of stem cell therapies available online with a view to making recommendations for travel medicine practitioners.

2. Materials and methods

This research is based on an analysis of stem cell clinics with an online presence. A web-based search utilising five search terms was employed: stem cell clinic, stem cell cure, stem cell therapy, stem cell treatment, and stem cell centre. The first twenty pages of each search result were further screened. This strategy yielded 1091 web pages and the homepage of each site was assessed as to whether or not it was a stem cell clinic that administered stem cells to treat human disease.

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