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Subcutaneous immunoglobulin therapy (SCIG)

Treatment management app

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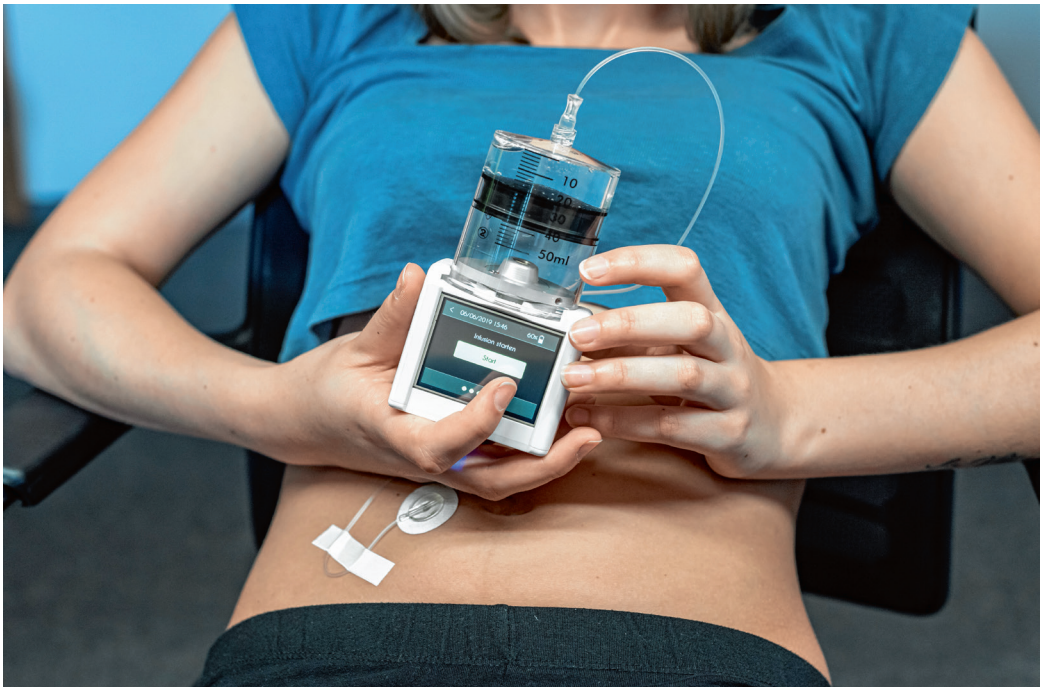

Mobile infusion pump SO❤CONNECT+

Subcutaneous treatment is uncomplicated and - in contrast to i.v. therapy - may be undertaken at home by the patients themselves after appropriate education. In addition to the immunoglobulin medication, this type of treatment requires an infusion pump suitable for subcutaneous immunoglobulin therapy. The immunoglobulin medications approved for subcutaneous administration are very concentrated high viscosity protein solutions. This requires special infusion pumps.

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For chronic inflammatory neurological diseases and all types of immunodeficiencies, primary (PID), secondary (SID) and iatrogenic immunodeficiencies, the subcutaneous administration of immunoglobulins offers an attractive and modern treatment option. The benefits are obvious: Significantly better tolerance for patients, better efficacy due to smoothed drug levels without breakthrough symptoms or breakthrough infections, self-treatment at home and significant cost savings for the health insurance providers are just some of the numerous benefits.
Drawbacks are the training costs, lack of billing options for colleagues in private practice and the fact that the burden of batch documentation in accordance with the German Transfusion Act is shifted to the patient.

Subcutaneous treatment options

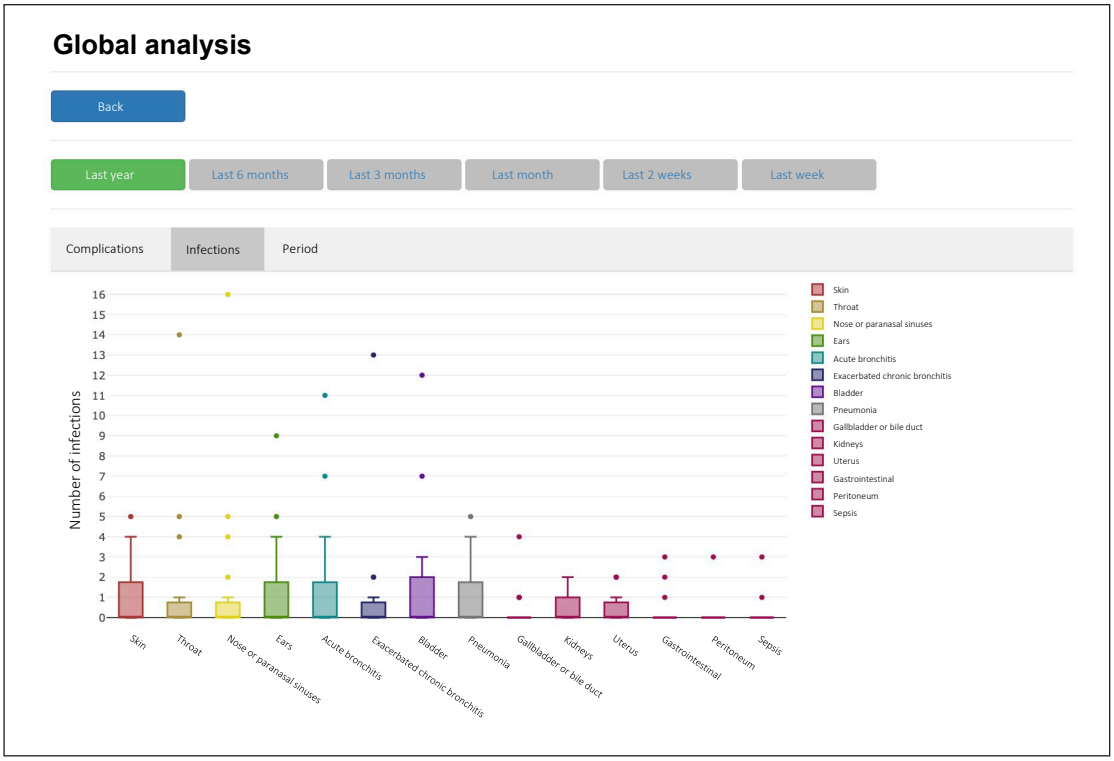
At present, three medications are marketed for standard subcutaneous treatment. While two of these drugs have concentrations of 20%, one of them is slightly less concentrated at 16.5%. The amino acids glycine and proline are utilized as stabilizers. Tolerance is generally excellent, with only local adverse events dominating. Low rates of reddening, swelling, induration and possibly symptomatic local pain regress rapidly with continuing treatment. The pivotal study of the market-leading product demonstrated a probability of about 20% for adverse local events when first administered; in the following 4 months the rate of local adverse events decreased to almost 10%. Subsequently, the probability of adverse events remained in the low single-digit percentage range. Systemic adverse events are negligible with the subcutaneous treatment option compared with i.v. therapy (with an incidence of between 1:700 and 1:1000).

Long-term treatment is easily managed; in Siegen we have been treating patients this way for more than 23 years with excellent results.

The significantly higher immunoglobulin doses required in chronic inflammatory neurological diseases (dosing up to 5 times higher than in immunodeficiencies) are also readily managed. It is interesting to note the feedback of these patients that continuous subcutaneous therapy controls their symptoms better than the intravenous treatment option.

Education programs for controlled self-treatment

Once the diagnosis and indication have been established, patients are best prepared for their self-treatment at home by a multi-stage education program. At their first education session, the treating physician will provide the patients (and their family members) with comprehensive information about the indication, planned treatment, treatment alternatives, choice of the most suitable medication, effect and potential adverse events, complemented by a suitable large screen PowerPoint presentation.



DA-App: Profile for doctors. The global analyses documented here are examples, serve as illustrations and do not represent scientifically sound results.

Subsequently, a test dose of the appropriate ready-to-use medication (usually 5 or 6 ml immunoglobulin over 2 hours) will be administered by the outpatient clinic staff. In addition, the appointment is also used for basic treatment education (material and methods) and for verifying the tolerability of the medication chosen.

Visits 2 (10 or 12 ml over 3 hours) and 3 (20 or 24 ml over 4 hours), usually at weekly intervals, are used for uptitration and to deepen the training content.

After visit 2, the treating physician assesses the local tolerance and applies to the health insurance provider for reimbursement of a pump.

Subcutaneous immunoglobulin infusion treatment

The official application includes extensive information on the patient's medical history, diagnosis and indication for therapy, as well as information on the patient's level of training.

It should be noted that as long as the treatment is within the approved setting, there is no need to apply for and obtain approval for the immunoglobulin medication itself. This pertains to medical freedom of therapy; in Germany the health insurance provider has no say here. Time and again, this leads to misunderstandings and unauthorized, and therefore situationally undue, involvement on the part of the health insurance providers and the MDK (German Medical Review Board of the Statutory Health Insurance Funds), with unnecessary delays in approval. The mandatory cost-effectiveness considerations must be observed, with significant cost savings favoring the treatment with SCIGs. The new EMA Core-SPC for the intravenous use of immunoglobulins in secondary immunodeficiencies (effective since 01/01/2019), which, due to the obvious disregard of relevant trial results, does not adequately represent important constellations in daily clinical practice and creates additional and unnecessary problems.

When selecting the pump, it is important to ensure adequate pressure (immunoglobulins are highly viscous protein concentrates), uncomplicated programming and the ability to drain any residues.

Today, the mobile infusion pump SO♥CONNECT+ (marketed by OMT GmbH & Co. KG) is used almost exclusively. It is characterized by its compactness, high operational reliability and modern architecture including documentation software and Bluetooth interface.

After visit 3, the patient receives his/her treatment calendar and uptitration schedule, which contains the comprehensive diagnosis and informs the patients and specialist or family physician further about handling the medication.

After three education sessions, more than 98% of the patients are able to carry out the home treatment on their own.

As a rule, the pumps are delivered to the patient's home and include a personal pump training according to the German Medical Devices Act. The pump supplier is also available as a supplier of consumables and as contact for software updates and any questions or problems that may arise.

A follow-up visit to the center after 3-4 months serves to resolve any open questions and to review the treatment quality.

Further follow-up visits are scheduled at intervals of 6 to 12 months. Enrolled patients with uncomplicated courses present once a year.

App development in cooperation with Siegen University

So far, interim contacts have primarily been made by phone or e-mail. It was obvious and in the interest of the patients concerned to develop an app for both therapists and patients providing communication, treatment documentation and control on a common and straightforward basis.

The search for qualified partners for the development of the IDA app was successful with the chair of "Medical Informatics and Microsystems Design" (headed by Prof. Rainer Brück, PhD) and the Section of "Knowledge-Based Systems & Knowledge Management" (headed by Prof. Madjid Fathi, PhD) at Siegen University. A continuing one-year project has been established in the master's program in "Medical Informatics", with the second working group of 5 students already developing software. The following general conditions were particularly important for the specifications: Documentation in accordance with the German Transfusion Act (TransfG), documentation of ongoing treatment including tolerance and adverse events, safety and protection of data, telemedicine support, quicker doctor-patient contact, patient-specific (after authorization by the patient) and cumulated analysis of the data.

Implementation of these strategies required the development of application concepts for smartphone/tablet and a physician portal.

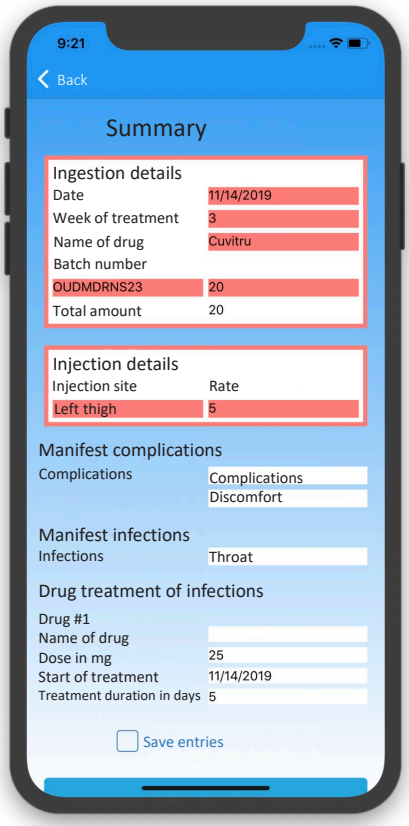
App development for numerous end-user devices with various operating systems and programming languages (IOS and Android) required a programming language (Xamarin) that bridges both platforms and requires as few individual lines of code as possible (only about 3%).

Universal data availability made it necessary to manage the data in a virtual database (cloud computing), with regular backups to prevent loss of data. The selection criterion for the cloud storage was physical storage in Germany (Amazon Cloud, Frankfurt am Main), adherence to ISO/IEC 27001:2013 and GxP certificates and conformity with the conditions of the German Federal Data Protection Act (BDSG).

Open communication always entails the risk that unauthorized persons may read or modify the data without being noticed. Therefore, the data is of course encrypted using the HTTPS protocol. Amazon Cognito is used for access authentication, authorization and user management (creating, editing, deactivating and deleting users) and can be integrated quite easily into mobile and web applications. Multiple data exchange is possible after a single login.

Part of the concept was a user study and the user-oriented modification of the app through direct patient contact. Improvements were made to the clarity, handling, functionality and data schemes, and topic-related pages, reduced scrolling and drop-down menus were installed.

Other patient requests included PDF printout of the documentation, push notification (medication reminder, medication management), appointment request, scan function for batch numbers, reading out the pump and pump control. The latter requires approval as a medical device.



With the coming into effect of the "Digital Care Act" (DVG), medical apps that have been tested may be prescribed in the future. The costs for using approved health apps are covered by the German statutory health insurance funds. As the next step, the IDA app must be tested by the Federal Institute for Drugs and Medical Devices (BfArM) for data security, data protection and functionality. Only then can the app be listed in the "Directory of digital health applications". The basic prerequisite is, of course, that the diagnosis is substantiated. Health insurance providers may also approve health apps without a prescription.

Summary

The app, which is unique to date, allows patient-friendly, future-oriented treatment monitoring and represents a powerful analysis tool for the issue of adverse events and treatment quality.

Information

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