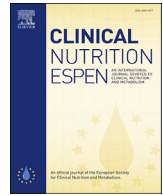




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Original article

Home medical nutrition during SARS-CoV-2 pandemic – A position paper



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SUMMARY

Background: The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the cause of a worldwide rapidly spreading illness, Coronavirus Disease 2019 (COVID-19). Patients fed enterally and parenterally at home are exposed to the same risk of infection as the general population, but more prone to complications than others. Therefore the guidance for care-givers and care-takers of these patients is needed.

Methods: The literature search identified no relevant systematic reviews or studies on the subject. Therefore a panel of 21 experts from 13 home medical nutrition (HMN) centres in Poland was formed. Twenty-three key issues relevant to the management of SARS-CoV-2 infection or COVID-19 in the HMN settings were identified and discussed. Some statements diverge from the available nutrition, surgical or ICU guidelines, some are based on the best available experience. Each topic was discussed and assessed during two Delphi rounds subsequently. Statements were graded strong or weak based on the balance between benefit and harm, resource and cost implications, equity, and feasibility.

Results: the panel issued 23 statements, all of them were graded strong. Two scored 85.71% agreement, eleven 95.23%, and ten 100%. The topics were: infection control, enrolment to HMN, logistics and patient information.

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Conclusions: the position paper present pragmatic statements for HMN to be implemented in places without existing protocols for SARS-CoV-2 pandemic. They represent the state of knowledge available at the moment and may change should new evidence occurs.

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1. Introduction

A novel coronavirus, named severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), resulted in an acute respiratory illness epidemic in Wuhan, China in the late 2019 [1–3]. The World Health Organization (WHO) termed the illness caused by the microbe the Coronavirus Disease 2019 (COVID-19). At the moment, the COVID-19 had become a pandemic and had affected over 3.000.000 individuals in more than 210 countries, and resulted in more than 234.000 deaths worldwide [4].

Home medical nutrition (HMN) patients, both fed enterally (home enteral nutrition, HEN) and parenterally (home parenteral nutrition, HPN), are at the same risk of infection as the general population, but much more exposed to the risk of severe complications of COVID-19 (due to impaired immunity and comorbidities). They require specialized care and increased attention.

Over last few weeks some organisations and societies have issued statements on the infection control, screening and diagnosis in the general population, such as surgery or ICU, however, no information on HMN patients has ever been published [5–8].

To improve this situation, a panel of Polish HMN experts decided to prepare and publish statements that can be used during the everyday care of HMN patients, being fully aware that most of these have not been validated. Nonetheless, the main aim was to pragmatically implement nutritional care in HMN individuals to improve patient care in order to cope with the current crisis.

2. Methods

The literature search identified no relevant systematic reviews or studies on the subject.

Search strings were: ("severe acute respiratory syndrome coronavirus 2"[Supplementary Concept] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR "sars cov 2"[All Fields]) AND ("parenteral nutrition, total"[MeSH Terms] OR ("parenteral"[All Fields] AND "nutrition"[All Fields] AND "total"[All Fields]) OR "total parenteral nutrition"[All Fields] OR ("parenteral"[All Fields] AND "nutrition"[All Fields]) OR "parenteral nutrition"[All Fields] OR "parenteral nutrition"[MeSH Terms] OR ("parenteral"[All Fields] AND "nutrition"[All Fields]))

("COVID-19"[All Fields] OR "COVID-2019"[All Fields] OR "severe acute respiratory syndrome coronavirus 2"[Supplementary Concept] OR "severe acute respiratory syndrome coronavirus 2"[All Fields] OR "2019-nCoV"[All Fields] OR "SARS-CoV-2"[All Fields] OR "2019nCoV"[All Fields] OR (("Wuhan"[All Fields] AND ("coronavirus"[MeSH Terms] OR "coronavirus"[All Fields])) AND (2019/12 [PDAT] OR 2020[PDAT]))) AND home[All Fields] AND ("nutritional status"[MeSH Terms] OR ("nutritional"[All Fields] AND "status"[All Fields]) OR "nutritional status"[All Fields] OR "nutrition"[All Fields] OR "nutritional sciences"[MeSH Terms] OR ("nutritional"[All Fields] AND "sciences"[All Fields]) OR "nutritional sciences"[All Fields]))

To address HMN-related issues a panel of 21 experts from 13 HPN and HEN centres in Poland was formed. The centres take care of more than 800 HPN patients (95% of Polish adult HPN population) and more than 7000 HEN patients (>95% HEN population).

Locations: Lublin, Skawina, Warszawa (2), Lodz, Olsztyn, Bialystok, Wroclaw, Bydgoszcz (2), Gdansk (2), Jelenia Gora and Rzeszow.

Twenty-three key issues relevant to the management of SARS-CoV-2 infection or COVID-19 in the HMN settings were identified and discussed.

Statements diverge from the available nutrition, surgical or ICU guidelines, some are based on the best available experience [5–8]. Each topic was discussed, and assessed during Delphi rounds subsequently. Statements were graded strong or weak based on the balance between benefit and harm, resource and cost implications, equity, and feasibility.

3. Results

The following statements were formulated in the process.

Statement 1: In accordance with anti-epidemic principles, the patient and caregiver's contact with third parties (including medical staff) should be reduced to a minimum necessary to ensure patient safety.

(Strong statement, 100% agreement)

Rationale: Patients eligible for nutritional treatment are particularly at risk of infection and the severe course of COVID-19 due to reduced immunity due to the underlying disease, gastrointestinal insufficiency and its sequelae and the treatment used.

Statement 2: General criteria for the population to be enrolled to HEN and HPN program are as follows:

- a) HEN - should cover the same patient population as before
- b) HPN - patients with long-term prognosis should be prioritized

(Strong statement, 85.71% agreement)

Rationale: Due to the limited possibilities of hospitalization of patients in case of complications, enrolment of patients for treatment at home should be rationalized. In the case of terminal patients, the decision to include parenteral nutrition should always be individualized. Patients with poor prognosis, including patients with terminal cancer, requiring parenteral nutrition, should be referred to care in a stationary hospice or to care and treatment facilities.

Statement 3: Each patient before admission to the HMN hospital to initiate parenteral nutrition, previously hospitalized in another hospital or in another hospital ward must be tested for SARS-CoV-2 infection.

(Strong statement, 95.23% agreement)

Statement 4: Testing for SARS-CoV-2 infection is obligatory in patients with:

- a) a positive epidemiological history
- b) symptoms of SARS-CoV-2 infection
- c) symptoms of catheter infection – in every situation there is a risk of SARS-CoV-2 infection
- d) other complications requiring urgent hospitalization

(Strong statement, 95.23% agreement)

Statement 5: A patient (not yet HMN patient) with a positive result for SARS-CoV-2 infection, which requires nutritional

treatment, must be treated at the dedicated COVID-19 hospital or in an infectious ward or in a protective profile department of COVID-19 patients, in consultation and cooperation with the staff of the nutritional treatment center. The place of treatment depends on the patient's clinical condition and the availability of nutritional treatment in a given ward.

(Strong statement, 100% agreement)

Statement 6: Enrolment of patients with active SARS-CoV-2 infection for HMN is in most cases impossible as the treatment of ongoing infection involves many specialists. Another reason is the high risk of infection of the medical personnel.

(Strong statement, 95.23% agreement)

Statement 7: In patients with SARS-CoV-2 infection who require nutritional treatment, it is recommended to carry out nutritional therapy in the specialized ward for patients with COVID-19, and the implementation of nutritional treatment at home may take place only after negative SARS-CoV-2 swab test results of the patient and the caregiver.

(Strong statement, 95.23% agreement)

Statement 8: a patient fed enterally or parenterally and suspected of SARS-CoV-2 infection (positive epidemiological history, signs of infection) must remain isolated until a negative SARS-CoV-2 infection test is obtained. Depending on the patient's condition, isolation should take place at home or in the isolation room of the hospital providing nutritional treatment. If the first test result obtained is negative, further patient treatment should continue in home or hospital isolation until a second SARS-CoV-2 infection is performed after a week. In the case of a second positive result, depending on the patient's condition, further nutritional treatment of the patient must be continued in the conditions of a designated infectious hospital/unit and conducted in cooperation with the staff of the nutritional treatment center.

(Strong statement, 95.23% agreement)

Statement 9: In exceptional cases, remote (using telemedicine) qualification for HEN adults is acceptable.

(Strong statement, 85.71% agreement)

Conditions required for remote enrolment for HEN:

1. A patient hospitalized in the hospital ward due to the underlying disease (regardless of profile) is reported by the attending physician to the Nutrition Treatment Center. During hospitalization, nutritional status is assessed, access to the gastrointestinal tract is created, a set of laboratory tests is performed, a selected and developed nutrition program is started, and the intake of diet is commenced.
2. The patient or the caregiver is trained in caring for access to the gastrointestinal tract and administering an industrial diet to the extent that it is possible to carry out nutritional treatment at home.

All of the above activities must be coordinated by the staff of the Nutrition Support Team (NST).

3. After remote qualification, the patient receives from the NST enteral diet and accessories for short-term supply.
4. After the patient and/or the legal guardian, or the patient and the family/home members have obtained negative test for SARS-CoV-2 virus, a planned qualification visit will take place.

Statement 10: Training for caregivers of HMN patients is carried out outside the hospital ward, in a nutritional treatment clinic or at the patient's home.

(Strong statement, 95.23% agreement)

Rationale: In the state of epidemics, it is strictly forbidden for people other than staff and patients to enter hospitals.

Statement 11: If you work with a patient or caregiver who has a negative epidemiological history, we recommend that you use the following personal protective equipment during a medical visit, nursing visit, and when educating the patient and/or caregiver with medical personnel:

- a) surgical mask or N95/FFP2 mask
- b) disposable gloves
- c) disposable long-sleeved apron at minimum

To be considered:

- d) a disposable waterproof long-sleeved apron (e.g. surgical) or a 4-B or higher suit
- e) safety goggles or goggles or a protective helmet
- f) surgical cap

The patient and caregivers should have a mask during the visit (surgical recommended)

(Strong statement, 95.23% agreement)

Statement 12: When working with a patient who is nutritionally treated with suspected or confirmed SARS-CoV2 infection, we recommend the use of the following personal protective equipment during the medical visit, nursing visit and during the education of the patient and/or caregiver with medical staff:

- a. N95/FFP2 or FFP3 masks (with or without valve)
- b. Safety goggles/goggles or protective helmet
- c. A disposable non-woven uniform and a disposable waterproof apron with long sleeves (e.g. surgical) to protect the body or a 4-B or higher suit
- d. Two pairs of gloves
- e. Disposable shoe covers
- f. A disposable cap or a hood cap
- g. Personnel requiring vision correction should wear glasses, not contact lenses.

The patient and caregivers should wear a surgical mask during the visit.

(Strong statement, 95.23% agreement)

Statement 13: Routine laboratory monitoring should be limited to minimum only to cases when metabolic or septic complications are suspected.

(strong statement, 100% agreement)

Statement 14:

Follow-up visits to metabolically stable patients should be postponed or carried out in the form of telemedicine. An example of tele-visit – see attachment 2.

(Strong statement, 100% agreement)

Rationale: See statement 3. The social distancing rules should be applied.

Statement 15: During the preparation of the package with equipment and/or diets and nutritional mixtures for the patient, it is recommended that the staff works in surgical masks and disposable gloves.

(Strong statement, 100% agreement)

Statement 16: During the delivery of the equipment, industrial diets and nutritional mixtures, the patient/carer's contact with the courier should be limited to the absolute minimum. No personal contact is advised. Packages left under the door/gate/at the entrance should be collected after the departure of the delivery person.

(Strong statement, 100% agreement)

Statement 17: In case of the necessary contact between the caregiver or patient receiving the delivery, the delivery person should use the following personal protective equipment: surgical

mask or FFP2 mask, and disposable gloves (changed each time). During the delivery, the patient or caregiver should use a surgical mask and disposable gloves.

(Strong statement, 95.23% agreement)

Statement 18: To apply the social distancing rule during the delivery of medical supplies to the patient's home, it is allowed for the recipient (patient/caregiver) not to sign personally on the Delivery Documents. During the epidemic, the accepted confirmation of the delivery is the certificate of a person who physically delivers products for nutritional treatment.

(Strong statement, 100% agreement)

Statement 19: Special rules to secure the supply of equipment, industrial diets and nutritional mixtures for a patient with suspected or confirmed SARS-CoV2 infection should be applied. These include:

1. Unit staff - including a delivery person should be trained to comply with the principles how to reduce the risk of infection.
2. The scheduled delivery should be preceded by an epidemiological interview with the patient and the caregiver made by a member of the nutritional team over the phone or the patient's status should be checked in the quarantine database.
3. Delivery takes place after the telephone contact and within a specific time frame. No (or limited to minimum) physical contact of the patient/carer with the delivery person is recommended.
4. The delivery person should use the following personal protective equipment: masks: FFP2 or higher model, and disposable gloves (changed each time). If the transport requires contact with the patient or their carer, the supplier should be secured as in statement 11 or 12
5. Medical supplies and equipment should be delivered to the previously agreed spot (at the door of the patient's home/apartment/at the gate) and collected after the departure of the delivery person.
6. When receiving a delivery, the patient or caregiver should use a surgical mask and disposable gloves.
7. Confirmation of delivery is a certificate of a person who delivers products for nutritional treatment signed on Delivery Documents.

(Strong statement, 95.23% agreement)

Statement 20: Patient/care-giver should be instructed how to proceed during SARS-CoV-2 pandemic. The key points are as follows:

1. Upon determining the demand for a diet/equipment, contact a nurse/physician/pharmacy for an epidemiological interview
2. Be sure to inform the members of the nutritional treatment clinic team about: epidemiological supervision, quarantine, signs of infection (fever, cough, shortness of breath, muscle aches or other new symptoms) or any confirmed COVID-19 infection in the patient or caregiver.
3. For your own good always arrange the contact with a delivery person over phone, be precise about the delivery time to minimize contact duration.
4. Prepare for delivery pickup to minimize duration of exposure.
5. Ask the delivery person to leave the package at the door to avoid any direct contact with the supplier.
6. Carry and open packages while wearing mask and disposable gloves.
7. After opening or moving packages with the diet/nutritional mixture/equipment supplied, remove gloves and wash your hands thoroughly for a minimum of 30 s

(Strong statement, 100% agreement)

Rationale for statements 3–20: The risk of SARS-CoV-2 virus infection should be minimized in hospital wards initiating parenteral nutrition due to their scarcity. HMN centers are responsible for

a large number of patients undergoing nutritional treatment at home, who cannot be left unattended. Transmitting infection to HMN personnel terminates in practice the access to this method of treatment for patients from the vast area.

Statement 21: Processes carried out at the HMN unit should be limited to the minimum necessary, mostly to cases requiring immediate intervention. All administrative tasks should be performed remotely. Staff should rotate on regular basis, to limit the risk of contamination. It is recommend to form two teams working 7 day shifts.

(Strong statement, 100% agreement)

Rationale: The number of people staying in the clinic's rooms should be limited, therefore a rotational work system should be introduced, i.e. employees of the clinic come in shifts so that there are as few people as possible at a time. In addition, individuals should not contact each other physically, which protects against the possible spread of infection and enables the continuity of the clinic's work. The majority of activities should be performed remotely from home, which reduces the number of people needed to operate in the clinic.

Statement 22: It is advised to temporarily close stationary outpatient clinics, if all the staff is able to perform its work according to the schedule, but remotely.

(Strong statement, 100% agreement)

Rationale: Employees visiting patients in the mode of telemedicine can successfully perform this work from home in most cases. Remote work decreases the risk of infection. Should the on-site visit be necessary, it should be carried out at the patient home or at the Nutritional Treatment Center.

Statement 23: Nutrition clinics can provide additional medical support in currently available and patient-safe hospitals located at such a distance from the center that enables safe and prompt transportation.

(Strong statement, 95.23% agreement)

Rationale: In the current situation of the pandemic, hospitals operate in an open-surgery mode, so some of them perform the function of single-name hospitals or their profile has changed recently due to the new unmet health needs of patients with COVID-19. Some of these units have terminated their cooperation with outpatient nutrition clinics or are unable to grant stationary support in previous form. Nutrition Treatment Clinics should be able to provide required medical treatment in currently available and safe for the patient hospitals regardless of the administrative boundaries of regions.

Conclusions

Herein, we publish a pragmatic set of statements for the delivery of HMN in time of SARS-CoV-2 pandemic. In the protocol, some procedures diverge from the available nutrition guidelines. Some discrepancies appeared due to specific settings of HMN patients and the environment. The latter include shortage of staff, increased daily workload, and need to reduce contact with patients infected with SARS-CoV-2. Authors hope that present statements can become pragmatic guidelines for HMN and to be implemented in places without existing protocols for SARS-CoV-2 pandemic. They represent the state of knowledge available at the moment and may change should new evidence occur.

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Przemyslaw Matras (PM) and Stanislaw Klek (SK) coordinated the work of the group. They were responsible for the conception, and contributed to the design, data interpretation and writing of the manuscript. The other Authors contributed to data collection, discussion on statements and critical revision of the manuscript.

Annex 1. (Strong consensus, 100% agreement)

Enrolment procedure – modifications acceptable depending on the current SARS-CoV-2 epidemic status.

1. The unit/physician referring the patient for home nutritional treatment contacts the home nutrition outpatient clinic to determine patient referral and obtain initial guidance.
2. It is recommended that the unit electronically provide scans of patient records, referrals, or current laboratory tests (including tests related to the assessment of nutritional status), and the results of basic anthropometric measurements (body weight, height).
3. If the management unit is in a hospital, basic training of the patient in handling enteral access is recommended during the stay in that unit.
4. A patient transferred from the hospital to another unit providing parenteral nutrition at home must have a test for SARS-CoV-2 infection performed.
5. The caregiver appointed for the procedure must have a complete epidemiological history collected and documented.
6. A caregiver appointed for training in parenteral nutrition cannot be at the time of qualification: under epidemiological supervision, quarantine, symptomatic or asymptomatic SARS-CoV-2 infection.
7. Patients qualified for enteral nutritional treatment should be provided with permanent access to the gastrointestinal tract. If this is not possible, temporary access should be placed until permanent access can be established.
8. For patients qualified for enteral nutritional treatment at home, the first stage of patient qualification should be telemedicine with the unit's physician and the nurse. During tele-visit following aspects have to be covered:
 - a. Providing the patient with all necessary information required during patient training,
 - b. Nutritional and medical history,
 - c. Basic training should cover:
 - i. Organizational matters of the HMN procedure
 - ii. The basic principles of nutrition access and care
 - iii. Dietary rules
 - iv. Complications of nutrition and management of complications
 - d. If possible, all information documents on the procedure and documents required for signature will be sent to the patient electronically.
 - e. The patient/caregiver will be instructed to summarize questions and concerns about the procedure (preferably in writing) that require personal training (such as access control, pump management).
 - f. Epidemiological history of COVID-19 infection risk of the patient and the caregiver will be collected.
 - g. The patient should give oral consent for personal contact with medical personnel during qualification and should be informed about the risk of infection. He gives his written consent during the first personal visit.
 - h. The whole tele-visit should be documented and become a part to the patient's medical history.
9. When the tele-visit is accomplished, the on-site visit to the outpatient clinic or patient home will be scheduled. Rules for a home visit are as follows:

- a. The duration should be reduced to a minimum.
- b. Only the patient and caregiver are allowed to be present during the visit

Should the visit take place at the Nutrition Clinic, it should be precisely scheduled in order to reduce the waiting time to minimum.

Annex 2. Template of telemedicine check-up of HMN patient

(95.23% agreement)

Date	Patient phone number
Surname, name ID number (if available)	
Questions about the COVID 19 risk (according to the agreed schedule)	
Nutritional access: Type, local condition (redness, pain, etc.), patency, tunnel leakage, swelling, risk assessment of catarrhal infection Available: dressing agents, disinfectant access, saline solution for flushing Questions to determine the health status: Feeling unwell, fever, chills, weakness Self-reliance Urination, passing of stools Stoma, fistulas, difficulties in breathing, Other alarming symptoms Body weight Recent weight loss/gain Current nutrition program Checking the nutrition program: nutrient mixture ingredients, additives, infusion fluids diets, extra fluids equipment Audit of the nutritional treatment program Systemic symptoms Respiratory (cough, shortness of breath, pain in breathing) circulatory (chest pain, palpitations) abdominal (stomach ache, bowel movements, gas, stool, flatulence) urinary (lumbar pain, dysuria) osteoarticular, nervous, mental condition Caregiver availability Recent medical interventions Documentation sent remotely (what, documents, photos) statements e-prescriptions Signature	

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