**Introduction**

Globally, in 2019, HIV infection was still responsible for 1.7 million new infections and for 690,000 deaths in the same year. Tailored and new antiretroviral therapy (ART) regimens, individualised follow-up and new technologies to support data-sharing between health-care professional caring for people living with HIV (PLHIV) and to deliver ART to patients are desperately needed to reach the 90-90-90-90 ambitious goals. The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) virus, responsible for the Coronavirus-19 (COVID-19) pandemic that spread globally in 2020, posed a huge challenge for PLHIV and HIV physicians worldwide in terms of continuum of care. In this paper we encourage “up-to-date patient-centred HIV medicine” and give nine ideas to improve HIV management in clinical practice during the COVID-19 pandemic.

**Methods**

The text of this nine-point manuscript was ultimately organised in the following major paragraphs: i) HIV-tailored follow-up; ii) integrated HIV outpatient service; iii) HIV online-consultation; iv) ART-delivering; v) ART-monitoring; vi) inter-regional clinical data sharing; vii) pro-active screening; viii) HIV-dedicated wards; ix) HIV-physician training; x) future challenges and conclusion. Every paragraphs highlights how to implement the subject within the clinical practice.

**HIV-tailored follow-up**

Thanks to ART, sustained viral suppression (viral load $< 50 \text{ copies/ml}$) and prompt immune stability (CD4+ cell count $> 500 \text{ cell/mm}^3$) can be achieved, ensuring immunovirological benefits to our patients [9, 10].
laboratory monitoring, clinical follow-up visits, tailored regimens adjustments according to patient needs, side effects, drug-drug interactions (ddi), comorbidities, co-infections, and availability of drugs, in order to preserve efficacy, safety and, ultimately, adherence to treatment and retention to care [11, 12].

Substantial time and costs for patients and healthcare systems are deployed to standard check-up, while individualised visits and laboratory monitoring should be tailored on patients’ profile, enhancing patients’ quality of life and decreasing healthcare costs [9]. In the setting of acute infection, late presenter, and in any case in which patients need to start art, prompt antiviral treatment should be initiated.

For instance, in case of virological suppression, immunological recovery, good psychological and clinical condition, no comorbidities, no risk-factors for co-infections, well tolerated art regimens, good adherence to treatment, and no complains by the patient, laboratory monitoring, co-infection screening, and clinical check-up could be delayed every 6-8 months [13]. Vice-versa, if a patient displays risky behaviours for co-infections, immunovirological goals are not met, art regimen is leading to intolerance and/or ddIs and/or scarce adherence to treatment, follow-up visits should be anticipated, even monthly, in order to offer counselling, timely screening, and treatment simplification to improve patients’ quality of life [14, 15].

**INTEGRATED HIV OUTPATIENT SERVICE**

Hiv-outpatients service should be “patients-centered”, offering clinical answers to patient both for hiv related issues and non-hiv complications resulting from art, co-infections and/or aging, as well as prep and post-exposure prophylaxis (pep) [16, 17]. Scheduled follow-up visits with the possibility of specialists’ consultation other than infectious diseases specialists (namely: pulmonologist, gastroenterologist, cardiologist, gynecologist, gerontologist, immunologist, psychologist, psychiatric, hospital pharmacist, cultural mediator as well as peer-patients meetings) can improve patients retention to care, creating an unique environment to pursue the goal of hiv-care. This integration can be done by a group of hospital in confined area.

**HIV-ONLINE CONSULTATION**

When disruption of normal health-care system procedures prevents access to care or when it is not feasible for the patient reaching her/his hiv-dedicated outpatient service, retention to care should be still ensured [18]. Telemedicine, with free online video-call and text-message reminders for appointment and art delivery, could overcome the problem created by interrupted hiv-services, avoiding exposure to pathogens in time of pandemics, offering continuum to care to our patients [19]. However this consultation does not replace the face-to-face visit, but constitutes a new way of relating.

**ART DELIVERING**

Again, if normal follow-up of PLWH is not possible or risky due to external conditions or patients’ inability, technology-supported ART delivery should be considered [20]. In sub-Saharan Africa, drone delivery of HIV test and ART has been found feasible as well as mobile fully-equipped ART clinics; this switching the paradigm from “patients go to ART” to “ART goes to patient” [20]. Strategic placement of electronic pick-up machines, where registered patients can receive tailored treatment refill, coupled with text-message reminders on patients’ mobile phone, is another example of how ART delivering could be made more efficiently and safer for patients. Moreover, ART delivering shouldn’t be offered monthly, but according to patient’s peculiarity (adherence to treatment, effective presence at online tele-consultations), it can be delivered for the following 2-3 months, reducing costs.

**ART MONITORING**

To fulfil the UNAIDS third “90” (viral suppression) ambitious goals, ART monitoring can be enhanced through periodic text reminder for ART administration, portable point-of-care HIV-viral load self-testing with results live-delivered to health care providers, in order to timely decide possible clinical visit, further laboratory test (e.g. resistance testing, CD4+ cell count) and treatment changes [21, 22]. Indeed, treatment-as-prevention (TasP) can be achieved only if our patients are constantly virologically suppressed, highlighting how even the first two “90” of the UNAIDS strategy are linked to effective ART monitoring. ART monitoring includes for the HIV physician to be updated with new antiviral agents in commerce, possible side effects, DDIs, and with national and international guidelines, to promote best patients’ care [23].

**INTER-REGIONAL DATA SHARING**

To convey and uniform clinical data, clinical practices, monitoring patients’ laboratory exams and treatment’ history, discuss challenging cases among HIV physicians, and to share data to perform trial, an online inter-regional platform should be implemented between HIV-referral centres across the nation [24]. The experience of the “Rete Ligure”, in the Ligurian Region of Italy (extended to other infectious diseases such as tuberculosis), which enables physicians to track and monitor patients’ progress, retention to care, and HIV historical genotype as well as ART history, is an example of how health care providers can deliver a better service to patients and reduce ART related expenditure thanks to an interconnected health care system [25-27].

**PRO-ACTIVE SCREENING**

HIV screening, with opt-out strategy, should be part of daily clinical activity in Infectious Diseases wards, pregnant woman, outpatients service for sexually-transmitted infections, patients undergoing immunosuppressive treatment (e.g. oncology, haematology-oncology), and before surgical procedures [28]. Moreover, person at risk should be offered HIV periodically-scheduled screening in dedicated outpatient services or at home with self-testing with immediate linkage to care if resulted positive [28].
However, “pro-active screening” does not involve just HIV-testing in at risk population, but regularly screening viral hepatitis (hepatitis A, hepatitis B, hepatitis C, hepatitis D), tuberculosis, human papilloma virus (HPV), opportunistic infections, sexually transmitted diseases, and, when actively circulating, virus-responsible for pandemic in PLHIV [29, 30]. Active vaccination of vaccine-preventable infections should be promoted.

**HIV-dedicated wards**

Viruses with pandemic potential are emerging faster causing exponential growth of infected patients, reallocation of health-care resources, disruption of ambulatory services and fear of health-care settings [18, 31]. However, preparedness to avoid to stop or to reduce HIV routine care should be prioritized, as well as the creation of HIV-dedicated wards for patients that require hospitalization, with properly trained staff (doctors, pharmacists, nurses and other health care professions), screening for pandemic viruses prior-to-admission and linkage to HIV-outpatient service after discharge.

**HIV-physician training**

HIV care is evolving quickly and, to provide comprehensive primary health care services to PLHIV, it is necessary for young Infectious Diseases specialists to own a solid background in infectious diseases, internal medicine, and epidemiology. Moreover, HIV-specialists need to be updated on new drugs available, DDIs, comorbidities, PrEP, PEP, and psychological counselling at diagnosis and during follow-up [32]. HIV-related continuing medical education should be encouraged and periodically done to awake and answer to intellectual challenges encountered by HIV physicians in daily practice (e.g. drug interactions between new ART regimens) and to care for the whole person rather than just to achieve viral suppression [33].

**Future challenges and conclusion**

Currently, online consultation, via email, in the Ligurian Region has been implemented, giving the chance to all patients to consult ID specialists even during lockdown. In the next future, pro-active HIV screening should be encouraged among General Practice doctors, through dedicated courses by ID specialists, in order to implement the path to linkage to care. Moreover, annual inter-regional or national post-graduate course for ID specialist, willing to take care of PLWH, should be promoted. Finally, inter-regional data sharing through dedicated online platform should be implemented.

The over-mentioned goals may represent the first steps to improve HIV management in clinical practice to keep delivering to our patient the best possible care.

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