severe COVID-19 patients. The middle vertical line indicates the pooled SMD of 25 studies, and the two side vertical lines represent the 95% confidence interval (CI) values. Every hollow round indicates the pooled SMD when the left study was omitted in a meta-analysis with a random-effect model.

Fig S3. Begg's funnel plot of the 25 studies reported the platelet count of both severe and non-severe COVID-19 patients. The horizontal line indicates the pooled standardized mean difference (SMD). The asymmetry of two oblique lines was tested by Egger's linear regression test ($P = 0{\cdot}328$).

Fig S4. Result of sensitivity analysis on odds ratios (OR) of thrombocytopenia for severe COVID-19 patients. The middle vertical line indicates the pooled OR of 15 studies, and the two side vertical lines represent the 95% confidence interval (CI) values. Every hollow round indicates the pooled OR when the left study was omitted in a meta-analysis with a random-effect model.

Fig S5. Begg's funnel plot of the 15 studies reported the proportion of thrombocytopenia in both severe and non-severe COVID-19 patients. The horizontal line indicates the pooled odds ratio (OR). The asymmetry of two oblique lines was tested by Egger's linear regression test ($P = 0{\cdot}735$).

Table SI. Characteristics of studies reported the platelet count in both severe and non-severe COVID-19 patients.

Table SII. Characteristics of studies reported the proportion of thrombocytopenia in both severe and non-severe COVID-19 patients.

Data S1. Materials and methods.

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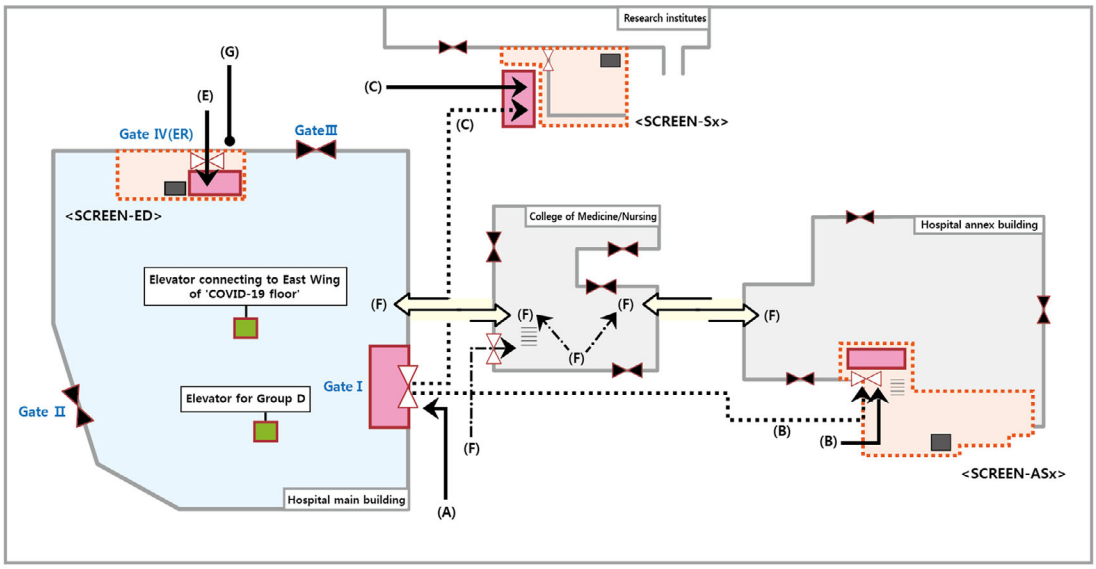
Successful prevention and screening strategies for COVID-19: focus on patients with haematologic diseases

Haematologic patients are immunocompromised and particularly susceptible to life-threatening viral infections.[1] Regarding the worldwide outbreak of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2), the first case was diagnosed in Korea on January 20, 2020.[2,3] With COVID-19 spreading, the number of new COVID-19 cases had increased exponentially with a peak of 909 new infections on 29 February in Korea.[4] The World Health Organization declared the COVID-19 pandemic on 11 March, and as of 6 May 2020 more than 3·5 million cases have been confirmed around the world.

In-hospital outbreaks of SARS-CoV-2 infection can have a major negative impact on providing essential medical services, and temporary hospital closures may be necessary to prevent further transmission.[5,6] The European Society for Blood and Marrow Transplantation recommends that, in this pandemic situation, non-urgent haematopoietic stem cell transplantation (HSCT) should be deferred if possible.[7] However, if the medical use of HSCT in severely ill patients is restricted, there may be a worsening of their underlying diseases. Thus, appropriate screening strategies are needed for triaging patients to block the influx and nosocomial spread of COVID-19 while continuing to provide essential medical services for haematologic patients.[8,9]

Seoul St. Mary's hospital, which serves as a national referral hospital, has 1 365 beds. Our haematology hospital, which is part of Seoul St. Mary's Hospital, is the largest medical institute for haematologic patients in Korea. We have four buildings in use: the main hospital, and an annex, college, and research institute (Fig 1). The main hospital contains all the facilities, including outpatient clinics, imaging departments, a clinical laboratory, a stem cell processing facility, and about 250 beds, for haematologic patients.

We classified hospital users based on their symptoms, potential epidemiological risk factors, and the purpose of their



Classification of hospital user	Descriptions
A-1	Asymptomatic, outpatients, without epidemiological basis
A-2	Asymptomatic, patients for admission, without epidemiological basis
B-1	Asymptomatic, outpatients, with epidemiological basis
B-2	Asymptomatic, patient for admission, with epidemiological basis
B-3	Asymptomatic, new outpatients with hematologic disease
C-1	Symptomatic, outpatients, with or without epidemiological basis
C-2	Symptomatic, patients for admission, with or without epidemiological basis
C-3	Symptomatic, visit for testing COVID-19
D	COVID-19 confirmed cases
E	Emergency patients
F	Healthcare workers
G	Hematopoietic stem cell transporter from other institutes

Symbols or Markings	Descriptions
	Opened gates
	Closed gates
	Screening clinics
	Isolated room for aerosol generating procedures (*i.e.* nasopharyngeal/oropharyngeal swab or sputum collection for COVID-19 PCR)
	Questionnaire preparation area
	Dedicated elevator connecting to COVID-19 floor
	Bridge connecting building on 2nd floor for Group F
	Moving routes according to classification of users
	Arranged moving routes for patients after visiting Gate I
	Moving routes for healthcare workers

Fig 1. Classification of hospital users and moving routes. (A) Group A: If no risk factors are identified by filling out the questionnaire and submitting it to the security personnel in the 'questionnaire preparation area' (Groups A-1, A-2), the visitor enters the main hospital through Gate I and their body temperature is measured. Patients who report symptoms at Gate I are directed to the symptomatic screening clinic (SCREEN-Sx, dotted line). (B) Group B: If the patient resides (or has visited within the past 14 days) in a region classified as domestic COVID-19 'special management zones' by the Korean government (*i.e.* Daegu City, and surrounding North Gyeongsang Province), has attended a gathering where a COVID-19 outbreak had been reported, or has visited a 'COVID-19 epidemic area' within the past two weeks, they are referred to the asymptomatic screening clinic (SCREEN-ASx) to rule out asymptomatic SARS-CoV-2 infection. The definition of 'COVID-19 epidemic area' was initially limited to China, but was expanded sequentially to all other countries. Group B-2 patients are hospitalized after being confirmed to have negative results for SARS-CoV-2 using real-time polymerase chain reaction (RT-PCR) testing of nasopharyngeal and throat swab samples. They are admitted to a buffer ward (East Wing, Zone A) on the COVID-19 floor with a separate heating/ventilation/air conditioning system, and observed to determine whether symptoms occur during the incubation period. Group B-3 – even if they report that they are asymptomatic – are directed to SCREEN-ASx for X-ray screening and a check of their medical condition by haematologists, and then proceed to the main hospital upon approval. (C) Group C: All symptomatic patients are guided to the SCREEN-Sx: Group C-1, patients who were aware of their symptoms and/or signs; group C-2, symptomatic patients needing hospitalization; and group C-3, patients who visited to be evaluated for COVID-19. Symptomatic patients (Group C) are managed in a space separate from the asymptomatic patient groups (Groups A and B). (D) Group D: Confirmed cases of COVID-19 transferred from other medical facilities are moved via a dedicated elevator, entering the elevator in the first basement, and connecting to the isolation ward (West Wing) of the COVID-19 floor. (E) Group E: If the patient visits the emergency department with signs or symptoms suggestive of COVID-19, SARS-CoV-2 PCR and/or chest X-ray are performed in a negative-pressure room. Patients with pneumonia needing hospitalization are admitted to the COVID-19 floor after they have tested negative for SARS-CoV-2 on PCR at screening clinic. (F) Group F: The route of healthcare workers (HCWs) to the main hospital is separated from the route taken by patients. (G) Group G: Persons delivering unrelated-donor haematopoietic stem cells from other institutes are not allowed to enter the main hospital, and stem cell delivery to the main hospital building is done outside the hospital building. *Others: Accompanying guardians are only permitted to enter the main hospital if necessary and are asked to fill out a questionnaire for symptoms and epidemiological risk, like the patients.

hospital visit, and applied stringent moving route control within the hospital according to their classification. All outpatients, inpatients, and medical staff were grouped according to the purpose of their hospital visit using a questionnaire (Fig 1). The questionnaire (Data S1) was created and updated based on the national and global epidemic information.[10]

Gates

We changed patient flow and hospital services as follows: Gates II and III of the main hospital were closed. All visitors should enter through Gate I, except for patients needing emergency care, who entered through Gate IV. All individuals were

required to state whether they had COVID-19-related symptoms and/or epidemiological risk factors by answering the questionnaire. At Gate I, security personnel measured visitors' body temperature with a non-contact thermometer. Thermal imaging cameras were also installed in the main connecting passages and monitored by security staff.

New screening clinics, patient flow, and the 'COVID-19 floor'

We set up three screening clinics (SCREENs) in separate areas: (i) for asymptomatic but at risk patients (SCREEN-ASx) in the annex; (ii) for symptomatic patients (SCREEN-Sx) in the research institute; and (iii) for critical patients in the emergency department (SCREEN-ED). Each SCREEN

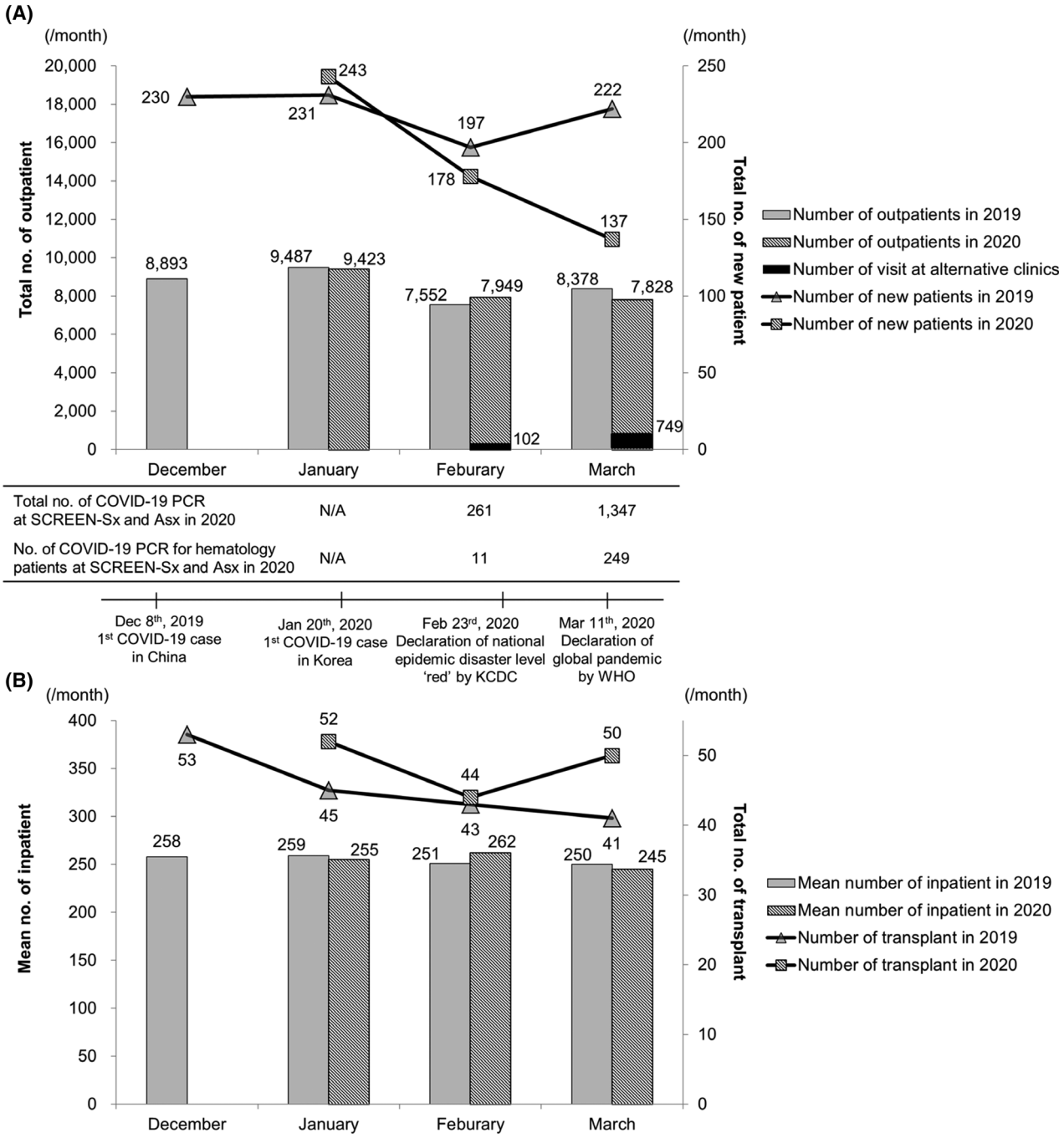


Fig 2. The performance of medical services since the beginning of the COVID-19 pandemic and during the corresponding period in 2019. (A) Monthly total numbers of outpatient care and total number of new patients. (B) Mean number of inpatients per month, and monthly total numbers of haematopoietic stem cell transplantation procedures.

had a separate space to collect respiratory specimens. To avoid unnecessary visits to the main hospital, these clinics provided oral prescriptions as well as laboratory/imaging tests. We also provided other forms of alternative clinical services such as tele-clinics and clinic visits by the guardian without the patient. SCREEN-ASx also had beds to provide simple procedures including transfusion, administration of granulocyte colony-stimulating factor, and indwelling-catheter care to haematologic patients. The patient flow according to group is shown in Fig 1.

We remodelled the entire floor of the hospital (hereafter the 'COVID-19 floor', Figure S1) dividing it into three spaces: (i) intensive care unit for critically ill COVID-19 (West Wing) patients; (ii) buffer rooms for asymptomatic patients with epidemiological risk factors (East Wing–Zone A); and (iii) buffer rooms for patients with pneumonia who required further monitoring of signs related to COVID-19 (East Wing–Zone B). The heating/ventilation/air conditioning system of the COVID-19 floor was separated from that of the other floors. All patients' rooms were set to negative pressure. For neutropenic patients, an anteroom is kept at negative pressure, and the room where the patient stays is set for positive pressure. Healthcare workers (HCWs) routinely reported their body temperature and any symptoms by a web-based system. HCWs used a separate route (F) to access the main hospital (Fig 1).

Until 24 April 2020, seven critically ill COVID-19 patients confirmed from outside were hospitalized in the West Wing of the COVID-19 floor, and there were four newly diagnosed COVID-19 patients in SCREEN-Sx and SCREEN-ED. There have been no cases of nosocomial onset or spread of COVID-19 in our hospital to date. The proportion of haematologic patients using alternative clinics increased from 1·3% in February to 9·6% in March 2020. In March 2020, we provided alternative consultations by tele-clinics ($n = 194$) and the guardian without the patient ($n = 68$) as well as SCREENs ($n = 487$). We performed 260 SARS-CoV-2 PCR tests for haematologic patients in February and March 2020. Among the haematologic patients, 1·3% were admitted to the East Wing of the COVID-19 floor. Despite the decreasing number of new haematologic patients over the course of the COVID-19 epidemic, the number of outpatient visit, mean number of inpatients each month, and the number of HSCT per month were comparable to those in the corresponding months of 2019 preceding the COVID-19 epidemic (Fig 2).

Several factors may have contributed to the successful prevention of in-hospital COVID-19 transmission without interruption of all treatments for haematologic patients: First, a screening questionnaire and measuring the body temperature were introduced at the hospital entrance and in each clinic. Second, patient groups and their moving routes were rigorously controlled. Third, SCREENs were housed in different buildings so that patients at risk were screened without entering the main hospital. Fourth, symptomatic patients were screened at SCREEN-Sx before entering the outpatient clinic area or hospitalization, and asymptomatic patients at epidemiological risk were also screened at SCREEN-ASx for hospitalization. However, the current mass-screening strategy is labour-intensive and requires dedicated cooperation from employees as well as visitors.

We have maintained our medical service for haematologic patients using the aforementioned systematic approaches. These could be valuable to avoid unnecessary scare about continuing treatments for immunocompromised patients. We hope that our experience may contribute to rapid ending of the COVID-19 pandemic.

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Author contributions

S-YC and S-SP contributed the conception and design of the study, and participated in data interpretation and drafting the article. D-GL and D-WK conceived the idea and planned the project, analyzed data, and revised the manuscript critically. J-YL, Y-JK, H-JK, C-KM, and BC reviewed and revised the paper. S-YC and S-SP contributed equally to this work. D-GL and D-WK contributed equally to this work.

Conflicts of interest

None of the authors have any conflicts of interest to report related to this work.

Ethical statement

The Institutional Review Board of Seoul St. Mary's Hospital approved the research protocol and waived the need for informed consent due to the anonymous and retrospective design of the study (KC20RISI0273).

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Supporting Information

Additional supporting information may be found online in the Supporting Information section at the end of the article.

Fig S1. The three zones of the COVID-19 floor: (1) The West Wing for critical care of confirmed cases of COVID-19: one allocated elevator was used only for confirmed patients (red line); (2) East Wing–Zone A with buffer room for asymptomatic patients with epidemiological risk factors (Group B-2); and (3) East Wing–Zone B with buffer room for suspicious patients in need of further monitoring of signs/symptoms related to COVID-19 (Group C-2).

Data S1. Screening Questionnaire for COVID-19.

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First COVID-19 maternal mortality in the UK associated with thrombotic complications

We report the first maternal death of a 29-year woman of Pakistani origin at Birmingham Heartlands Hospital (BHH), UK on 8 April 2020.

She had a body mass index (BMI) of 35, type 2 diabetes mellitus (T2DM) treated with metformin and insulin, renal tubular acidosis, asthma and vitamin D deficiency. In her first pregnancy, she had a stillborn baby. At her first antenatal (booking) visit, her glycated haemoglobin (HbA1c) was 9·7%. She also had a high albumin creatinine ratio but with normal kidney function (Fig 1).

She was admitted in mid-January 2020 due to poor diabetes control and low serum bicarbonate levels. An ultrasound scan at 26 weeks gestation showed a big baby with increased amniotic fluid volume (polyhydramnios).

She had more than 20 hospital attendances in March 2020 due to the baby's reduced movements. She received corticosteroids for fetal lung maturity. Fetal surveillance was normal.

She was admitted to the BHH delivery suite on 24 March 2020 (~29 weeks gestation) with fever. She was started on amoxicillin and enoxaparin for venous thromboembolism (VTE) prophylaxis and was tested positive for SARS-CoV-2. Her chest X-ray (CXR) was normal. Her temperature settled and she was discharged the following day.

She attended BHH on 1 April 2020 with severe breathlessness requiring 100% oxygen and was admitted to the High Dependency Unit of the delivery suite. Investigations revealed diabetic ketoacidosis and treatment started.

Next day, her respiratory function worsened and following a multidisciplinary meeting, delivery (~31 weeks gestation) by caesarean section under general anaesthesia was performed. She was transferred to the intensive care unit (ICU). Upon delivery her baby was immediately intubated and transferred to the neonatal ICU. Baby has been extubated