

The Oslo Blood Bank, 22 July 2011

We were at work at the Blood Bank of Oslo University Hospital one grey summer afternoon when we thought we heard a loud thunderclap. But it wasn't a thunderclap. «Yellow alert» was rapidly upgraded to «red alert».

The Blood Bank of Oslo is the largest in Norway, and is supposed to stock a minimum of 80 erythrocyte concentrates (SAGMAN) of blood type O RhD negative. Following a number of orders for blood just before the explosion, our stocks of O RhD negative blood had fallen below this limit, so that we only had 55 bags of SAGMAN blood. Our stocks of other types of blood were optimal. O RhD negative SAGMAN can be used in an emergency when a patient's blood type is unknown because it can be given to patients with any type of blood unless they have irregular blood type antibodies. Since only 15 % of Norway's population have the feature RhD negativity (1), blood type O RhD negative is a limited and very valuable resource.

I became the Disaster Management Administrator of my department because I was the senior consultant on duty, and led the work in close dialogue with the leader of the Blood Bank and the junior registrar on duty. The Oslo Blood Bank consists of three sections – for blood donation, component production and immunohaematology. During the disaster alert all sections were well staffed with around 28 employees who did an excellent job. Day shift personnel were still at work at the Section for Immunohaematology when the first disaster alert was given. Seven biomedical laboratory technicians from the day shift stayed, and together with the staff on the evening shift we had ten employees until midnight. The other sections provided twelve and three biomedical laboratory technicians/nurses on both 22 and 23 July.

Shortly after the highest alert was given, we got the first order for a trauma package from A&E. The trauma package, which consists of five units of SAGMAN, five units of Octaplas and two units of platelet concentrate, is issued immediately in acute cases. This is done without carrying out the necessary immediate spin and antiglobulin compatibility tests between patient and blood donor (and without any other immunohaematological investigations) when transfusion is indicated as part of life-saving treatment. Since the patients' blood types were not known at the time the order was received, we had to use O RhD negative emergency blood. More O RhD negative blood was shortly issued to the injured from the Oslo city centre, and a little later from Utøya. This accounted for a substantial amount of our emergency stock of O RhD negative blood. We contacted other blood banks in Southern Norway at an ear-

lier stage to get an overview of how much blood we could buy from them if we needed it. When information from the media indicated that the disaster was on a huge scale, we bought 80 units of O RhD negative SAGMAN blood, which arrived at the department during the evening. Our collaboration with the other blood banks functioned very well.

Blood donors

In parallel with supplies from other blood banks, we decided to call in O RhD blood donors, since our stocks of this blood type were low at the outset. Under normal circumstances collecting blood from donors is done during the day, with a 24-hour on-call nurse/ biomedical laboratory technician in addition to the junior registrar on duty. The blood-collection personnel had barely rung a couple of donors when the first donor arrived unannounced. He had been in Oslo city centre when the bomb exploded and felt a strong urge to do something for the injured. He walked all the way from the

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Oslo city centre to Ullevål University Hospital, since all public transport had come to a standstill.

In the hours that followed, many hundreds of donors who wanted to give blood arrived – whole busloads of them. The traffic was chaotic outside and was backed up for miles. The police had to direct the traffic, as the queue was blocking the way for ambulances and other emergency vehicles. There were blood donors everywhere – in the hall, on the stairs, in the lifts, in the blood collection rooms. At the entrance we tried to pick out donors with blood type O RhD negative who had previously donated blood at Ullevål University Hospital, because in emergency situations only blood from donors who are already registered at the blood bank in question can be used. It didn't help – people streamed in.

After a while, the guards from the Security Department gained control of the situation.

By midnight, twelve members of staff from the Section for Blood Donation had collected blood from 63 donors and answered almost 500 telephone calls, but many calls remained unanswered. Three employees from the Section for Component Production handled all the donated blood units. The Department of Microbiology carried out infection serology tests on urgent basis and sent us the results electronically. This is routine during the day, but as a result of the restructuring process at Oslo University Hospital, all urgent testing after 2.30 p.m. is done at Rikshospitalet and the serology results are faxed over. This implies a potential risk of delays and errors.

At midnight we published a message on the Blood Bank's website, thanking all blood donors who had turned up. We published a message on Facebook that we would be collecting blood on Saturday 23 July. That day blood was collected from 160 donors, most of them with blood type O RhD negative. We chose not to produce platelet concentrate from the extra units collected, because it did not look as though the need would be greater than we could meet with what we already had in stock.

Blood consumption

The amount of blood used in the course of 22 and 23 July was 60 erythrocyte concentrates, 14 platelet concentrates and 51 Octaplas. The total consumption for these components in the first five days were 84, 14 and 61 units, respectively, for the in all 32 wounded in Ullevål University Hospital (personal communication, Berit Gran, Department of Immunology and Transfusion Medicine, Oslo University Hospital, Ullevål). Not all of them needed transfusions. Blood consumption at other hospitals, to which even more patients, but with less serious injuries, were admitted, was minimal. After all the patient samples had been typed, we switched to dispensing matched blood. The relatively low blood consumption is in line with what is reported from other disasters (2–4).

External communication

On the evening of 22 July we were surprised by a television appeal to the effect that those who wanted to give blood could present themselves at the Blood Bank. This appeal did not come from the hospital. The Communications staff at Oslo University Hospital observed intense activity on

Twitter to the effect that many people wanted to give blood, and presented the matter to the Disaster Management Administration (personal communication, communication adviser Anders Bayer, Communications Staff, Oslo University Hospital) and the Blood Bank. We therefore joined forces with the Communications staff to send out a message on Twitter that we needed Ullevål University Hospital's established O RhD negative donors. The message was forwarded over a hundred times, and picked up by the media. The first message had to be explained further with several new Twitter messages that only the hospital's established blood donors must report, since there was such an enormous influx of donors.

The Communications Staff were also in contact with several media in the course of the evening to explain the message in more detail. They also made sure to ask media, security guards and police to thank all those who came, but had to be sent away, for their commitment (personal communication, Anders Bayer). Following a report from us, the Communications Staff sent out a new tweet just before midnight to say that the need had been met and to thank all those who had responded.

Previous disasters

Experience from previous disasters in other countries reveals a general tendency for blood consumption compared with the scale of the disaster (2–4). After the terrorist attacks in the USA on 11 September 2001, there were close to 3 000 dead and 4 000 injured. Nevertheless, only 200 of the injured were hospitalised, and the blood consumption the first day was only 258 erythrocyte units (2). This is partly because most patients had inhalation and burn injuries, which do not necessarily require blood. Nevertheless, a colossal blood collection process was launched, which resulted in almost 600 000 blood donations (2, 3). The Food and Drug Administration (FDA) authorised transfusion of blood components that had not been fully infection-tested as well as the use of volunteers in the infection testing.

It turned out that nobody dared to transfuse blood that was not fully tested. Numerous other units had to be discarded because of errors in the testing. This shows how important it is not to grant dispensation from important safety requirements in the event of disasters. Many hospitals were also unable to perform infection serology tests for so many collected units. In the end, at

least 300 000 units had to be discarded – enormous resources had been used to no avail (2, 3).

The symbol effect and altruism

During World War II, blood donation was a symbol of solidarity – those «at home» could show their support for the soldiers in the field. In connection with later disasters there have been several examples of overwhelming enthusiasm from blood donors and others who have wanted to give blood (2–6).

It is both understandable and natural that people want to do something for their fellow human beings when a disaster strikes. Altruism is the primary motivation of many blood donors (7). Although altruism is also the reason why blood donors continue to donate blood (7), recruiting donors at times other than disasters and getting them to come back again and again is a major challenge for all blood banks.

Challenges

One of the greatest challenges in the early evening of 22 July was that we had to estimate the need for blood without knowing the magnitude of the disaster, and without receiving any official information. We had to meet requirements, but avoid collecting blood from donors on too large a scale. Some of the injured would very probably need further operations soon, some of them even several times, or they might need transfusions over a long period of time. We could not collect blood from everybody who turned up. Nor could we drain the reserves of the other blood banks. We had to find the right balance – collect and buy sufficient blood units, and keep them within reasonable limits. But what is reasonable? Over-collection and purchase of blood from other blood banks could lead to massive discards of non-used units, a waste of money/resources, harm to blood donor recruitment later, and cause loss of trust in the transfusion service. After a great deal of deliberation, we collected until midnight on 22 July and decided to stay open the whole day on 23 July. So we collected blood from a total of 220 donors. Afterwards we noted a very low percentage of discards.

It was impressive and overwhelming to experience the response of hundreds of blood donors. Handling all those who turned up wanting to give blood, on the other hand, was very difficult. We have a potential for improvement here. The prompt and amazing effort on the part of the Secu-

rity Department and the police helped to resolve the chaos. In retrospect, we see that a clear message sent at a far earlier time to the media and other communication platforms would have been beneficial. Thanks to the impressive effort of all employees, who responded in a very short space of time, the disaster preparedness of the Oslo Blood Bank functioned well.

In the case of a disaster of this magnitude, only units from the blood banks stocks that are already collected and cleared can be used for acute life-saving treatment. It takes several hours from the time the blood donor meets up until the unit of blood is ready for transfusion. The blood banks are therefore dependent on a steady supply of donors to maintain an adequate stock of blood at any time. Blood components have limited shelf life. Impulsive and excessive collection of blood in a short period of time will therefore not ensure the patients' transfusion requirements.

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