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Venipuncture-Related Complications of Whole Blood Donation

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DONOR ADVERSE EVENTS (DAEs) RELATING TO venipuncture (VP) are usually mild and self-limiting. Rarely donors experience more severe complications which, in a worst-case scenario, could lead to long-term loss of upper-limb function and disability. Prompt recognition, assessment, and management of significant complications is important, particularly for some upper-limb DAEs that could pose an immediate threat to life or limb. Good VP practice and appropriate postdonation management is essential for all blood centers.

Frequency of Arm Complications

Many blood centers and hemovigilance organizations now include donor hemovigilance as part of their routine data collection, and this has

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Blood Donor Health and Safety

undoubtedly led to a better understanding of the frequency and severity of arm complications of donation.

Bruising is the most common arm complication, with rates reported by blood centers ranging from 0.3% to 1.2% of all donations.¹⁻³ Rates of up to 23% have been recorded if donors are interviewed after donation.¹ It should be noted that most of these “nonreported” bruises will be minor and resolve without incident.

The focus of this chapter will be on more significant arm DAEs, including arterial puncture (AP) and its complications, nerve injury, thrombosis, inflammation, and other arm pain. Serious arm complications are very rare after whole blood donation, with a reported frequency of around 1 per 100,000 donations.²⁻⁵ Table 4-1 summarizes

Table 4-1. Frequency of Arm Complications of Donation

Complication	Rate per 100,000 Donations	
	ISTARE Report, 2006-2016*	AABB Donor Hemovigilance Report, 2012-2017†
Hematoma	115	300
Arterial puncture	1.0	5
Delayed bleeding	1.2	1
Painful arm	20‡	-
Nerve injury	5.3§	20
Other arm pain	17§	40
Cellulitis	0.03§	-
Local allergic reaction	0.34§	3
Localized infection	0.17	1
Thrombophlebitis	0.24	-

*Data from the International Surveillance of Transfusion Adverse Reactions and Events database.³

†Data from the *AABB Donor Hemovigilance Report*.⁶

‡2006-2014.

§2015 onwards.

the incidence of specific complications in two large-scale analyses of donor hemovigilance data for whole blood and apheresis donation.

Good Venipuncture Practice

The antecubital fossa (ACF) contains several structures which are at risk of injury during whole blood donation, particularly as donation VP is carried out using a larger-gauge needle than would be used for routine blood samples. All VP staff should be trained in the anatomy of the ACF and in good VP technique.⁷⁻⁹

Best practice includes:

- Vein selection: The chosen vein should be palpable with a “bouncy” feel, well supported by surrounding tissue and large enough to receive a large-bore needle without collapsing. A vein should not be selected if there is any associated pulsation, as this suggests the presence of an underlying artery. Usually, the centrally located median cubital vein is most suitable, as it is less likely to be associated with structures that may be damaged during VP. The cephalic vein, which sits in the lateral part of the ACF, may be chosen but there is a risk to the lateral cutaneous nerve of the forearm, which often runs a similar course. The medial part of the ACF should be avoided if at all possible, due to the close proximity of the brachial artery and median nerve to the brachial vein.¹⁰
- Arm preparation: The donor’s arm should be in a comfortable position and well supported. Cleaning and disinfection of the ACF is carried out not just to ensure safety of the collected blood, but also to reduce the risk of inoculating the donor with potentially infective bacteria during the VP procedure.
- Use of the pressure cuff: The pressure cuff is inflated to aid vein selection but must be deflated to as low a level as possible once the needle has been inserted. The pressure should be checked if the donor reports tingling or discomfort in their fingers. Keeping the cuff at too high a pressure increases the likelihood of bruising.
- Needle insertion: The needle should be inserted at an angle of 10 to 45 degrees, and care should be taken not to go too deep into the arm. If blood flow is slow, the needle can be retracted slightly but not advanced, as there is a risk of piercing the back of the vein. Repeated needle adjustments must be avoided.