8 Practical Aspects of Immunization

Communicating with Parents/Care Givers

With several newer vaccines available in open market, it is an arduous task for pediatricians to offer ideal advice to parents regarding pros and cons of each vaccine. Most of these vaccines are included in category 3 in IAPCOI recommendations necessitating one to one discussion besides few exceptions in category 2 such as IPV and HPV vaccines. Thus, pediatricians are required to communicate properly with clarity and appropriate information that should help parents to make their own decision in favor or against each of these vaccines. Ideally we need to offer a balanced scientific view without appearing to suggest one way or another. Unfortunately, most of educated parents included, would leave the choice to their pediatricians and it is quite unfair to take responsibility of making a choice for parents.

Prerequisite of one to one discussion is commitment on the part of pediatrician to inform relevant facts about disease and vaccine. It takes very little time if one uses structured format covering important aspects in simple language. Following points need to be discussed regarding each vaccine.

1. *Risk of developing disease:* It is not possible to evaluate risk of disease in an individual child, but figures from literature may be quoted, e.g. the risk of invasive pneumococcal disease (IPD) in a healthy child aged less than 1 year is roughly 200 per 100,000 (as per Western data). Some general statements are also helpful. Water or foodborne infections are preventable to some extent but not airborne droplet infections. Risk of complications of disease is higher in

infants and younger children and in undernourished population. Age prevalence of disease decides appropriate age of vaccination as per the standard recommendations.

2. *Efficacy of vaccine:* No vaccine provides 100% protection though most of the vaccines do offer high degree of protection. Vaccines significantly decrease chance of disease and even partial protection is useful to prevent complications. Occasional failure of vaccine protection is no reason to consider against its use.
3. *Safety of vaccine:* Vaccines are very safe and serious adverse reactions are extremely rare. Media outbursts of fatal reactions to vaccines are mostly due to human error of administration and not due to vaccine itself. Thus benefits of vaccines outweigh risk of side effects caused by vaccines.
4. *Cost of vaccine:* Decision of affordability should be left to parents. It is important to reiterate facts that all vaccines are equally efficacious even though they may differ in their cost. For example, DTwP and DTaP are equally efficacious though differ in reactogenicity. Similarly, vaccines from different manufacturers are equally effective and indigenously manufactured vaccines are usually as good as imported ones.
5. Finally it is important to emphasise that above discussion is based on current understanding of vaccine and its present place in prevention of disease. With increasing experience over time, there can be a change in the recommendations of individual vaccine and it is necessary to adapt to such changes. For example, second dose of MMR is now recommended.

Many new vaccines are likely to be introduced over next few years. It would be a challenge for pediatricians to develop communication skills to discuss pros and cons of all these vaccines. But far more relevant is the need to keep updated on issues related to vaccines and disease prevention. It is only then; "one to one discussion" will become more meaningful.

Injection Procedure

Sterile Technique and Injection Safety

Hands should be cleansed with an alcohol-based waterless antiseptic hand rub or washed with soap and water between each patient contact. Gloves need not be worn when administering vaccinations, unless the person administering the vaccine has open lesions on hands or is likely to come in contact with potentially infectious body fluids. Needles used for injections must be sterile and preferably disposable. Auto disable (AD) syringes are single use, self-locking syringes designed in such a way that these are rendered unusable after single use. Thus they prevent immediate/downstream reuse and their use is being promoted in the national immunization program. A separate needle and syringe should be used for each injection. Changing needles between drawing vaccine from a vial and injecting it into a recipient is not necessary. If multi dose vials are used, the septum should be swabbed with alcohol prior to each withdrawal and the needle should not be left in the stopper in between uses. Different vaccines should never be mixed in the same syringe unless specifically licensed for such use, and no attempt should be made to transfer between syringes. Prefilling of syringes should not be done because of the potential for administration errors as the majority of vaccines have a similar appearance after being drawn into a syringe. Thus vaccine doses should not be drawn into a syringe until immediately before administration. To prevent inadvertent needle-stick injury or reuse, needles and syringes should be discarded immediately after use in labelled, puncture-proof containers located in the same room where the vaccine is administered. Needles should not be recapped before being discarded.

Injection Route, Site, Method and Needle Length (Table 8.1)

With the exception of BCG and sometimes rabies, all parenteral vaccines are given by the intramuscular (IM)/ subcutaneous (SC) route. The SC route is recommended for measles, MMR,

Table 8.1: *Injection site, type of needle and technique*

	Site	*Type of needle*	*Comments*
Intramuscular injections (needle should enter at a 90° angle)			
Preterms and neonates	Anterolateral thigh (junction of middle and lower third)	22-25 gauge, 5/8 inch	Skin should be stretched between thumb and forefinger
Infants (1 to <12 months)	Anterolateral thigh	22-25 gauge, 1 inch	Bunch the skin, subcutaneous tissue and muscle to prevent striking the bone
Toddlers and older children (12 months 10 years)	Deltoid OR	22-25 G, 5/8 inch	Skin should be stretched between thumb and forefinger
	Anterolateral thigh	22-25 gauge, 1 inch	Bunch the skin, subcutaneous tissue and muscle
Adolescents and adults (11 years onwards)	Deltoid or anterolateral thigh	< 60 kg 1 inch > 60 kg 1.5 inch	
Subcutaneous injections (needle should enter at 45° to the skin)			
Infants	Thigh	22-25 G, 5/8 inch	
>12 months	Outer triceps	22-25 G, 5/8 inch	
Intradermal injections			
All ages	Left deltoid	26/27 G, 0.5 inch	A 5 mm wheal should be raised

varicella, meningococcal polysaccharide, JE, yellow fever vaccines; either SC or IM route may be used for pneumococcal polysaccharide vaccines, IPV; the rest of the vaccines should be given intramuscularly. Generally speaking, there is no harm done if SC vaccines are given IM. However vaccines designated to be given IM should not be given SC due to risk of side effects (as seen with aluminium adjuvanted vaccines) or reduced efficacy (due to reduced blood supply in SC tissue and hence reduced immunogenicity). The gluteal region should never be used for administration of IM injections due to risk of sciatic nerve injury and reduced efficacy (rabies and hepatitis B vaccines). When used at the recommended sites where no large blood vessels exist, pulling back of the syringe to check for blood is not recommended. The needle should be withdrawn a few seconds after finishing administration of the vaccine (to prevent backflow of vaccine into the needle track) following which the injection site should be pressed firmly for a few seconds with dry cotton. The injection site should not be rubbed following injection.

If multiple vaccines are administered at a single visit, administration of each preparation at a different anatomic site is desirable. For infants and younger children, if more than two vaccines must be injected in a single limb, the thigh is the preferred site because of the greater muscle mass; the injections should be sufficiently separated (i.e., 1 inch or more if possible) so that any local reactions can be differentiated. For older children and adults, the deltoid muscle can be used for more than one intramuscular injection. If a vaccine and an immune globulin preparation are administered simultaneously (e.g., Td/Tdap and tetanus immune globulin [TIG], Hep B and hepatitis B immunoglobulin [HBIG]), separate anatomic sites should be used for each injection. The location of each injection should be documented in the patients' medical record.

Alleviation of Pain Associated with Injections

Comfort measures, such as distraction (e.g., playing music or pretending to blow away the pain), ingestion of sweet liquids, breastfeeding, cooling of the injection site, and topical or oral

analgesia, can help infants or children cope with the discomfort associated with vaccination. Pretreatment (30-60 minutes before injection) with 5% topical lidocaine-prilocaine emulsion can decrease the pain of vaccination by causing superficial anesthesia Topical lidocaine-prilocaine emulsion should not be used on infants aged <12 months who are receiving treatment with methemoglobin-inducing agents because of the possible development of methemoglobinemia. Use of a topical refrigerant (vapocoolant) spray immediately before vaccination can reduce the short-term pain associated with injections and can be as effective as lidocaine-prilocaine cream. Acetaminophen may be used immediately following DTP vaccination @ 15 mg/kg to reduce the discomfort and fever.

Record Keeping

The vaccine administrator must record the type of vaccine, brand name and date of administration of the vaccine in the patient's file/immunization record. In addition recording of the batch number of the vaccine is also recommended.

Medicolegal Aspects

The vaccine administrator must explain in detail the characteristics and anticipated side effects of the vaccine in reasonable detail to the caregivers prior to immunization. A verbal consent is usually adequate. In any case the recipient must be observed for any allergic effects for at least 15 minutes after vaccination and all resuscitative equipment must be kept standby for possible anaphylaxis (Table 8.2). The care givers should also be counseled about possible side effects, their management and danger signs before the vaccinee is sent home.

Table 8.2: *Minimum resuscitative equipment*

- Airway, ambu bag, mask, IV access (scalp vein, venflon), oxygen cylinder, syringes
- Injection adrenaline (1: 1000 solution)
- IV hydrocortisone
- Normal saline