Public Health and Preventive Medicine

Joint California Department of Health Services-California Medical Association Campaign to Eliminate Congenital Rubella Syndrome

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This is one of a series of articles from western state public health departments.

The California Department of Health Services and the California Medical Association joined forces in 1986 for an ongoing effort to eliminate the remaining morbidity and mortality burden that the congenital rubella syndrome continues to impose in California.

The Current Rubella Problem

Great strides have been made in the past 19 years in the control of rubella through the widespread use of rubella vaccine. The incidence of both rubella and of the congenital rubella syndrome has declined more than 90% since the introduction of the vaccine in 1969.[1] Despite this success, rubella virus circulation continues in this country, and because of susceptibility among teenagers and young adults, pregnant women continue to be infected by the rubella virus, often with disastrous consequences for the fetus.

While fewer than a dozen cases of congenital rubella syndrome have been reported annually in the United States in the past few years, problems of underdiagnosis and underreporting lead to estimates that the actual incidence may be more than 100 cases a year.[2] The average lifetime medical and custodial care cost of a patient with congenital rubella syndrome is more than $220,000.[3] Moreover, for every infant reported as born with the syndrome, an estimated ten pregnancies are terminated by therapeutic abortion because of acute rubella infection.[4] Further, many more pregnant women suffer anxiety caused by exposure to rash illnesses that may or may not be rubella.

In California, a large rubella outbreak in 1979 was followed by a rise in reported cases from 9 in 1979 to 17 in 1980. Similarly, an outbreak in this state in 1982 was followed by a rise in reported cases from three that year to seven in 1983. Again, estimates are that for every reported case, there are ten unrecognized or unreported cases of children born with congenital rubella syndrome and ten therapeutic abortions done because of rubella infection in early pregnancy.

There were at least seven rubella outbreaks in California in the first half of 1986, six of them involving young adults primarily. Rubella outbreaks in medical facilities have been a particular problem in recent years. Rubella susceptibility is nearly 20% among young adults in California,[5] and hospitals and outpatient clinics frequently employ them in significant numbers, thereby facilitating the transmission of infection that has been introduced. More than ten reports of rubella outbreaks in medical facilities have been published, and many others have occurred, with some of these outbreaks leading to infection of pregnant women. Managing such outbreaks can be time-consuming and costly. In addition to isolating ill patients, the facility must follow up on exposed pregnant women—patients, staff, and household contacts of staff—to determine if they have been infected, keep exposed susceptible staff off work for the balance of the incubation period, keep susceptible pregnant staff off work for the duration of the outbreak, postpone clinics, and conduct emergency staff immunization campaigns. Pregnant women who are infected must be counseled regarding the risk to their fetuses and advised regarding the option of terminating their pregnancies.

The rigorous enforcement of school entry requirements for rubella immunization in all states is producing very high immunization levels among school-age children. Because most states enacted such requirements relatively recently, however, and because in many states this immunization requirement does not extend through the secondary school years for all pupils, it will be at least a decade before cohorts of well-protected young adults replace their less well-immunized predecessors, thereby achieving sufficient "herd immunity" in this age group. In states that receive large numbers of unimmunized adults from countries where rubella infection

(Dales L, Kizer KW, Elliott GV: Joint California Department of Health Services-California Medical Association campaign to eliminate congenital rubella syndrome. West J Med 1988 Mar; 148:355-357)

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is less common, the problem may continue even longer. In the interim, without programs to immunize young adults—especially women of childbearing age—preventable cases of the congenital rubella syndrome will continue to occur.

Efficacy and Safety of Rubella Vaccine

The live attenuated RA 27/3 strain of human diploid cell-cultured rubella vaccine currently used in this country produces seroconversion rates in excess of 99%.[6] So far, antibody persistence for more than 15 years has been documented, and lifelong protection is anticipated for the vast majority of vaccinees.[7,8] Rubella outbreak investigations have shown a vaccine efficacy in protecting against clinical illness ranging from 90% to 97%.[9]

While rubella immunization during pregnancy is to be avoided, accumulating data continue to show no observed fetal risk associated with inadvertent maternal immunization. In the United States, West Germany, and the United Kingdom, 335 infants born to susceptible women who had inadvertently received rubella vaccine shortly before or during early pregnancy have been examined; none had the syndrome.[10,11] While the final decision must rest with the individual patient and her physician, the United States Public Health Service Immunization Practices Advisory Committee states that the risk of vaccine-associated defects is negligible and that inadvertent rubella immunization ordinarily should not be a reason to consider interrupting a pregnancy.[12] Also, rubella vaccinees do not shed the virus, so that household contacts of pregnant women can be immunized without the risk of spreading the vaccine virus to the pregnant women.

As many as 40% of susceptible adult women who receive the rubella vaccine have reported transient joint complaints; among immune subjects receiving rubella vaccine, the incidence of arthralgia or arthritis is no greater than in placebo recipients.[13] In rare cases, susceptible women receiving rubella vaccine have experienced recurrent episodes of arthralgia or arthritis that continue for several years.[14] The information on these prolonged episodes of joint problems following adult immunization is mostly based on anecdotal observations, however. In addition, most of the small number of women with this problem are asymptomatic between these episodes, which gradually diminish in frequency and severity. No joint destruction has been documented. The United States Public Health Service Centers for Disease Control staff do not think these rare events indicate the need for any change in current immunization practices.[15]

Young-Adult Rubella Immunization Campaign

To reach the goal of eliminating the congenital rubella syndrome soon, increased emphasis will have to be placed on immunizing women of childbearing age. This recommendation applies specifically to the following groups:

- Women found on premarital serologic screening to be susceptible to rubella—premarital rubella immunity screening is required in California for women younger than age 50.
- Women found to be susceptible on prenatal screening. Vaccine should be given promptly at the conclusion of pregnancy, whether that conclusion is a live birth, stillbirth, or spontaneous or therapeutic abortion.
- Women patients in family planning clinics who are known or presumed to be susceptible.
- Women known or presumed to be susceptible on discharge from a hospital, unless a contraindication exists, or at the time of outpatient office visits.
- Men and women known or presumed to be susceptible at the time of employment in medical facilities—hospitals, outpatient clinics, physicians' offices—or at the time of employment in any setting where a large number of children or young adults aggregate: day-care facilities, schools, colleges, or large office buildings, for example.
- All students in colleges and universities.

Screening for Rubella Immunity and Administering Rubella Vaccine

Either single-antigen rubella vaccine, combined measles-rubella vaccine, or combined measles-mumps-rubella vaccine can be used. Because of the safety of reimmunizing with these vaccines,[12,16,17] the combined vaccines can be given to those already immune to one or more of the components.

Because of the absence of adverse effects from rubella immunization in persons who are already immune, serologic screening for susceptibility before immunization is generally not necessary.[12] Further, persons should be considered immune to rubella only if there is documented laboratory evidence of such immunity—the presence of serum rubella antibody, for example—or documented immunization with rubella vaccine on or after the first birthday. Because of the unreliability of a clinical diagnosis of rubella, a history of clinical rubella disease cannot be considered sufficient evidence of immunity.

Screening for rubella vaccine contraindications can be done by questioning a patient; physical examination and laboratory tests are not necessary. The following persons should not receive the vaccine:

- Anyone with an acute febrile illness. Persons with mild upper respiratory tract infections or in the convalescent phase of an acute illness can be immunized.
- Persons with a proven severe allergy to the antibiotic neomycin sulfate, manifested by collapse, shock, tongue or mouth and throat swelling, hypotension, respiratory distress, or urticaria. For those receiving rubella vaccine that is combined with measles or mumps vaccines or both, a severe allergy to eggs is also a contraindication.
- Persons who are significantly immunocompromised as a result of immune deficiency diseases, including the acquired immunodeficiency syndrome, leukemia, lymphoma, or generalized malignancy, or who are immunosuppressed as a result of high-dose systemic steroid therapy, cancer chemotherapy, or radiation therapy. However, steroid therapy of less than two weeks' duration and topical steroid therapy generally are not contraindications to immunization.
- Women who are pregnant or who are likely to become pregnant within the next three months are not to be given the rubella vaccine. An appropriate screening question is, "Is it possible that you are pregnant now or likely that you will become pregnant in the next three months?" Women who answer "no" can be immunized. It is not necessary to limit immunization to women with menses within the preceding two weeks or with a negative pregnancy test. As mentioned earlier, information gathered to date shows no evidence of fetal damage from immunization unintentionally given during pregnancy.

The California Department of Health Services and the

California Medical Association have developed English and Spanish informational leaflets on rubella immunization aimed at women of childbearing age. Physicians and clinics can order supplies of the leaflets, free of charge, by writing to the Immunization Unit, California Department of Health Services, 2151 Berkeley Way, Room 712, Berkeley, California 94704.

REFERENCES

1. Bart KJ, Orenstein WA, Preblud SR, et al: Elimination of rubella and congenital rubella from the United States. Pediatr Infect Dis 1985; 4:14-21
2. Orenstein WA, Bart KJ, Hinman AR, et al: The opportunity and obligation to eliminate rubella from the United States. JAMA 1984; 251:1988-1994
3. Doster SW, Stetler HC, Orenstein WA, et al: Measles and rubella: Our remaining responsibilities (Editorial). Am J Public Health 1983; 73:490-492
4. Miller CL, Miller E, Sequeira PTL, et al: Effect of selective vaccination on rubella susceptibility and infection in pregnancy. Br Med J [Clin Res] 1985; 291:1398-1401
5. Dales LG, Chin J: Public health implications of rubella antibody levels in California. Am J Public Health 1982; 72:167-172
6. Brunell PA, Weigle K, Murphy MD, et al: Antibody response following measles-mumps-rubella vaccine under conditions of customary use. JAMA 1983; 250:1409-1412
7. O'Shea S, Best JM, Banatvala JE, et al: Rubella vaccination: Persistence of antibodies for up to 16 years. Br Med J [Clin Res] 1982; 285:253-255
8. Hillary IB, Griffith AH: Persistence of rubella antibodies 15 years after subcutaneous administration of Wistar 27/3 strain live attenuated rubella virus vaccine. Vaccine 1984; 2:274-276
9. Strassburg MA, Greenland S, Stephenson TG, et al: Clinical effectiveness of rubella vaccine in a college population. Vaccine 1985; 3:109-112
10. Centers for Disease Control: Rubella vaccination during pregnancy—United States, 1971-1985. MMWR 1986; 35:275-284
11. Sheppard S, Smithells RW, Dickson A, et al: Rubella vaccination and pregnancy: Preliminary report of a national survey. Br Med J [Clin Res] 1986; 292:727
12. Centers for Disease Control: Rubella prevention. MMWR 1984; 33: 301-318
13. Lerman SJ, Naukervis GA, Heggie AD, et al: Immunologic response, virus excretion, and joint reactions with rubella vaccine. Ann Intern Med 1971; 74:67-73
14. Tingle AJ, Chantler JK, Pot KH, et al: Postpartum rubella immunization: Association with development of prolonged arthritis, neurological sequelae, and chronic rubella viremia. J Infect Dis 1985; 152:606-612
15. Preblud SR: Some current issues relating to rubella vaccine. JAMA 1985; 254:253-256
16. Centers for Disease Control: Measles prevention. MMWR 1982; 31: 217-221
17. Centers for Disease Control: Mumps vaccine. MMWR 1982; 31:617-625

Book Review

The Western Journal of Medicine *does not review all books sent by publishers, although information about new books received is printed elsewhere in the journal as space permits. Prices quoted are those given by the publishers.*

Atlas of Drug Reactions

Edited by R. Douglas Collins, MD, formerly Associate Clinical Professor of Medicine, University of Florida College of Medicine, Gainesville, and formerly Director, Internal Medicine Residency Program, Pensacola Foundation for Education and Research, Inc, Pensacola, Florida. Churchill Livingstone Inc, 1560 Broadway, New York, NY 10036, 1986. 410 pages, $55.

Although Dr Collins dedicated his remarkable book, *Atlas of Drug Reactions,* to the family doctor, it is eminently practical for any medical specialist.

The book is "biologically appropriate." Reading it does not produce stress. It has a large, readable font (Times-Roman) with paragraph headings in large boldface type. The headings of all the principal drugs are listed on top of the pages under their generic and trade names. Adverse reactions are discussed and precautions recommended.

There is a lavish use of space, and yet none of it is wasted. The reader is provided with quick access to all the drugs currently being used. There is a colored plate, a sagittal section of a human, showing various organs such as the heart, lungs, liver, stomach, kidneys, bladder, and rectum. The plate also has a blood pressure gauge. Captions to the left of the diagram are connected with lines to the organs involved, and describe what particular problem is represented. For example, urinary retention has a line to the bladder, and mydriasis has a line to the iris. These colorful diagrams are extremely valuable in giving a preliminary idea of how the drug in question works. Also, the colored plate is repeated several dozen times. This repetition is quite acceptable and useful.

The book does not have the cramped dictionary style of most atlases. One experiences an immediate sense of relief on opening it, and the comfortable reading goes along with information that is thorough, scientific, and practical.

One of the most important things the book does is to provide information on drug interactions. This enables the physician to give patients advice about taking several drugs simultaneously and also compels the physician to ask the question: "What drugs are you taking, and when?" The headings also include contraindications, precautions, toxicity ratings, and treatment.

A toxicity rating—low, medium, or high—depends on the severity of the reactions. This is an extremely important addition to an atlas of this kind. There are headings on each drug under dermatologic, cardiovascular, gastrointestinal, hepatic, and other reactions.

There are two appendices, the first of which lists all the generic drugs and their therapeutic areas: disopyramide phosphate is listed as an antiarrhythmic agent; hydralazine hydrochloride, an antihypertensive; Oxytocin, a posterior pituitary hormone, and so forth.

The second appendix gives the generic names of all the drugs, along with their trade names, their classification, and any significant or serious drug reactions. For example, under the trade name of Anaprox, the generic name of naproxen sodium is given, the drug is classified as an antiinflammatory agent, and the significant or serious reaction is peptic ulcer. At the end of the book there is a detailed general index.

Dr Collins does not omit subjects that one might expect not to find in such an undertaking. He includes parasitic agents, topical otologic, nasal, and oral preparations, and dermatologic medications. There is also a complete list of biologicals such as antigens, antisera, extracts, toxoids, vaccines, and so forth.

Most of us have struggled with the tissue paper directions that come with drugs: the tiny print often requires the use of a magnifying glass, and the information succeeds in producing a kind of paranoia because the physician never really knows how safe the drug is and how to determine this. Dr Collins' book provides the physician with a secure kind of information that enables him to proceed with treatment without fear and with realistic information of what he might expect. Nobody can escape the statistical significance of a one in a half-million horrible happening, but one has to proceed with treatment, and the guidelines of Dr Collins' atlas are "state-of-the-art" in pharmacology.

One of the most important features of the book is the toxicity rating. Each drug is rated low, medium, or high in toxicity according to the frequency, severity, and reversibility of its adverse reactions. Quoting from Dr Collins' introduction, "Drugs such as sympathomimetics, antihistamines, and hypnotics are mostly rated low. On the other end of the spectrum are drugs such as aminoglycosides, which cause ototoxicity and nephrotoxicity, and phenylbutazone and chloramphenicol, which cause agranulocytosis. In between are a host of drugs with a medium to high rating, which require careful consideration before being prescribed. Some drugs have a moderate to high rating only when given parenterally."

This is more than a reference book. It provides an assortment of information that allows the physician to prescribe with caution and clearly states drug reactions and how to treat them. I found it a superb addition to my library, and since I began reading it, I have recognized a sense of security and efficiency in my approach to the problem of drug reactions. It has been a pleasure to be introduced to this remarkable atlas. It is extremely valuable, and I recommend it highly.

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