Zoster Vaccine Recombinant, Adjuvanted

AHFS Class: 80:12 — Vaccines (tofc-80)

Zoster Vaccine Recombinant, Adjuvanted *(AHFS DI)*

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Introduction

Zoster vaccine recombinant, adjuvanted contains recombinant varicella zoster virus (VZV) surface glycoprotein E (gE) and an adjuvant (i.e., AS01B) and is used to boost active immunity to VZV.[1,]

Uses

▪ Prevention of Herpes Zoster Infection

Zoster vaccine recombinant, adjuvanted is used in adults 50 years of age and older to prevent herpes zoster (also known as zoster or shingles) caused by reactivation of varicella zoster virus (VZV) infection.[1,] Zoster vaccine recombinant, adjuvanted is also used to prevent herpes zoster in adults ≥18 years of age who are or will be at increased risk of herpes zoster due to immunodeficiency or immunosuppression caused by a known disease or therapy.[1,] Shingrix® is currently the only preparation of recombinant zoster vaccine in the US.[1,166,] A live, attenuated zoster vaccine (Zostavax®) was previously available for use in the US from 2006 until its production for US distribution was discontinued in 2020.[17,166,]

Zoster vaccine recombinant, adjuvanted should not be used for treatment of zoster or postherpetic neuralgia (PHN).[4,] The vaccine should not be administered during an acute episode of zoster.[4,] Zoster vaccine has no role in postexposure management of zoster.[166,]

Zoster vaccine recombinant, adjuvanted should *not* be used for prevention of primary varicella infection (chickenpox).[1,4,] Zoster vaccine has no role in postexposure management of chickenpox.[166,]

Varicella (chickenpox) and herpes zoster (zoster, shingles) are distinct clinical entities caused by the same virus, VZV, a member of the family Herpesviridae.[4,6,7,13,16,166,] During primary infection, VZV causes chickenpox and the virus invades sensory neurons and becomes latent in sensory nerve ganglia, establishing a source of potential secondary infection.[2,3,6,7,13,15,16,166,] Natural varicella infection elicits development of specific antibodies and cell-mediated immunity and generally confers lifelong protection against subsequent varicella infection.[7,15,16,] Secondary infection results from reactivation of latent VZV and manifests as zoster.[6,7,13,15,16,166,] Zoster is characterized by a unilateral, painful, vesicular cutaneous eruption with a dermatomal distribution; however, the most frequently debilitating symptom is pain.[2,6,13,15,16,] Pain associated with zoster may occur during the prodrome, the acute eruptive phase, and the postherpetic phase of the infection (PHN).[6,13,16,] Serious complications, including scarring, bacterial superinfection, allodynia, cranial and motor neuron palsies, pneumonia, encephalitis, visual impairment, hearing loss, and death can occur as the result of zoster.[6,13,15,16,]

It is estimated that 1 million cases of zoster occur each year in the US;[166,] many patients develop PHN and require long-term management for refractory PHN.[4,7,13,166,] Over 90% of adults have been infected with VZV and are at risk of developing zoster.[13,] The risk of developing zoster increases with age and declining cell-mediated immunity to VZV.[1,2,3,4,7,13,15,16,166,] Zoster occurs principally in individuals older than 45 years of age;[2,3,4,7,13,15,16,] the lifetime risk of zoster is estimated to be at least 32%, and 50% of adults living until 85 years of age will develop zoster.[166,]

Clinical Experience

Adults 50 Years of Age or Older.

Safety and efficacy of zoster vaccine recombinant, adjuvanted for prevention of zoster have been evaluated in 2 multicenter, randomized, double-blind, placebo-controlled, phase 3 trials (ZOE-50 [study 1] and ZOE-70 [study 2]) that included a total of 27,922 adults 50 years of age or older (modified total vaccinated cohort) from North America, Latin America, Europe, Asia, and Australia.[1,2,3,] Trial participants were randomized to receive a 2-dose series of zoster vaccine recombinant, adjuvanted (second dose given 2 months after first dose) or placebo and stratified according to age (50–59 years of age, 60–69 years of age, 70–79 years of age, and 80 years of age or older).[1,2,3,] Individuals who had a history of zoster, history of vaccination against varicella or zoster, or were immunocompromised were excluded from ZOE-50 and ZOE-70.[1,2,3,] The primary efficacy end point in both trials was overall vaccine efficacy in reducing the risk of zoster compared with placebo.[1,2,3,] A secondary end point was the incidence of PHN.[1,2,3,] Median follow-up was 3.1 years (range: 0–3.7 years) and 3.9 years (range: 0–4.5 years) for ZOE-50 and ZOE-70, respectively.[1,2,3,] Cases of zoster were confirmed by polymerase chain reaction (PCR) or by a clinical evaluation committee.[1,]

ZOE-50 included 14,759 adults 50 years of age or older[1,2,] (mean age 62.3 years, 61.2% female, 72.3% White, 18.9% Asian, 1.7% Black, 7% other racial/ethnic groups).[1,] Results of this placebo-controlled trial indicated that 2 doses of zoster vaccine recombinant, adjuvanted given 2 months apart can reduce the risk of developing zoster in adults 50 years of age or older.[1,2,] Overall efficacy of the vaccine in preventing zoster in this age group was 97.2%.[1,2,] When stratified according to age, vaccine efficacy in preventing zoster was 96.6, 97.4, and 97.9% in adults 50–59 years of age, 60–69 years of age, and 70 years of age or older, respectively.[1,2,]

ZOE-70 included 13,163 adults 70 years of age or older[1,3] (mean age 75.5 years, 54.7% female, 77.6% White, 17.1% Asian, 1% Black, 4.2% other racial/ethnic groups).[1] Results of this placebo-controlled trial indicated that 2 doses of zoster vaccine recombinant, adjuvanted given 2 months apart can reduce the risk of developing zoster in adults 70 years of age or older.[1,3] Overall efficacy of the vaccine in preventing zoster in this age group was 89.8%.[1,2] When stratified according to age, vaccine efficacy in preventing zoster was 90% in adults 70–79 years of age and 89.1% in those 80 years of age or older.[1,2] Among those who developed confirmed zoster, use of pain medication for zoster-associated pain was reported in 43.5% of vaccine recipients versus 71.7% of those who received placebo.[1]

Participants in both phase 3 trials (ZOE-50 and ZOE-70) who were suspected of having zoster were monitored for the development of PHN (defined as zoster-associated pain rated by the patient as 3 or greater on a 10-point scale and occurring or persisting for at least 90 days following the onset of localized rash in those with confirmed zoster).[1,3] In ZOE-50, no cases of PHN were reported in vaccine recipients 50 years of age and older versus 18 cases in those who received placebo.[1] In ZOE-70, vaccine efficacy against PHN was 85.5%; 4 cases of PHN were reported in vaccine recipients versus 28 cases in those who received placebo.[1] The benefits of zoster vaccine recombinant, adjuvanted in the prevention of PHN may be principally due to the reduced incidence of zoster.[1]

Immune response to zoster vaccine recombinant, adjuvanted was evaluated in a random subset of patients from the phase 3 trials (ZOE-50 and ZOE-70).[9] At baseline, more than 99% of participants in these phase 3 trials were seropositive for anti-glycoprotein E (anti-gE) antibodies and median frequencies of gE-specific CD4 T-cells expressing 2 or more activation markers ($CD4^{2+}$ T-cell frequencies) were comparable between those randomized to receive zoster vaccine recombinant or placebo.[9] Results of the subset analysis indicated that 97.8% of vaccine recipients met the criterion for a humoral response compared with 2% of placebo recipients.[9] A mean peak response was observed at 1 month after the second dose of zoster vaccine recombinant, and 77% of vaccine recipients remained above the humoral response threshold at 36 months; postvaccination geometric mean anti-gE antibody concentrations were 39.1- and 8.3-fold higher than baseline antibody concentrations at 1 and 36 months, respectively, after the second dose.[9] Results of the subset analysis also indicated that the cell-mediated immune response (based on gE-specific $CD4^{2+}$ T-cell frequencies) was 93.3% at 1 month after the second dose of zoster vaccine recombinant, adjuvanted compared with no response in placebo recipients.[9] The minimum immune response that correlates with protection against zoster has not been established.[1]

Immunogenicity and safety of zoster vaccine recombinant, adjuvanted (2 doses given approximately 2 months apart) in adults 50 years of age or older with a history of zoster were evaluated in a phase 3, nonrandomized, open-label study.[5] The mean age of the 96 study participants was 64.9 years (range: 50–89 years of age) and all were seropositive for anti-gE antibodies at baseline; 67.7% had a history of clinician-documented zoster within the past 4 years and 32.3% had a history of clinician-documented zoster more than 4 years prior to study entry.[5] Individuals with active zoster, previous vaccination with varicella virus vaccine live or any zoster vaccine, and those with confirmed or suspected altered immunocompetence as the result of disease or immunosuppressive therapy were excluded.[5] Results indicated that immunogenicity and safety of zoster vaccine recombinant were not adversely affected by a previous zoster episode.[5] At 1 month after the second dose of zoster vaccine recombinant, adjuvanted, 90.2% of vaccine recipients had a 4-fold increase in anti-gE antibody concentrations compared with baseline concentrations.[5] Postvaccination geometric mean anti-gE antibody concentrations appeared comparable across all age groups (50–59 years of age, 60–69 years of age, 70 years of age or older) and across all timeframes since the previous episode of zoster (4 years or less, 5–9 years, 10 years or more).[5]

The long-term efficacy and safety of zoster vaccine recombinant, adjuvanted were evaluated in an open-label, phase 3b study (ZOE-LTFU) in patients ≥50 years of age who received zoster vaccine recombinant, adjuvanted in ZOE-50 and ZOE-70.[1,21] In ZOE-LTFU, the modified total vaccinated cohort included 7273 patients who were followed for a median of 5.6 years after vaccination in the parent trial; follow-up continued until a median of 11.4 years after vaccination.[1] The demographics of patients in ZOE-LTFU were similar to those in the parent studies; 28% of participants were 50–59 years of age, 17% were 60–69 years of age, 46% were 70–79 years of age, and 9% were ≥80 years of age.[1] During ZOE-LTFU, vaccine efficacy was 79.8% among those who were ≥50 years of age and 73.2% among those who were ≥70 years of age at first vaccination; initial vaccination was also 87.5% effective against PHN and 91.7% effective against other complications of herpes zoster among all patients ≥50 years of age.[21] Combined data from both age groups after receiving a second vaccine dose showed sustained efficacy of 82% in the eleventh year after vaccination.[21]

An open-label study was conducted to evaluate immune response to zoster vaccine recombinant, adjuvanted when administered to patients ≥65 years of age who were previously vaccinated with zoster vaccine live (Zostavax®) >5 years prior to study enrollment or had never been vaccinated with zoster vaccine live.[1,22] Patients in the study received 2 doses of zoster vaccine recombinant, adjuvanted given 2 months apart.[1,22] Those who had not previously received zoster vaccine live were matched to patients previously vaccinated with zoster vaccine live based on age, sex, race/ethnicity, and medical conditions.[1] Included patients had a mean age of 71 years; 100% were White and 51% were female.[1] Anti-glycoprotein E antibody concentrations were found to be noninferior between patients with and without prior vaccination with zoster vaccine live through 12 months after dose 2 of zoster vaccine recombinant, adjuvanted.[1,22]

Immunocompromised Adults 18 Years of Age or Older.

Safety and efficacy of zoster vaccine recombinant, adjuvanted for prevention of herpes zoster following autologous hematopoietic stem cell transplantation (HSCT) was evaluated in a phase 3, multicenter, randomized, placebo-controlled, observer-blinded study (ZOE-HSCT) that included a total of 1846 adults (≥18 years of age) who underwent autologous HSCT within the previous 50–70 days.[1,23] Efficacy was calculated post-hoc in another randomized, placebo-controlled, observer-blinded study in adults with hematologic malignancies who received the first dose of zoster vaccine recombinant or placebo during or within 6 months of completing immunosuppressive chemotherapy.[1] Both studies were conducted in North America, Latin America, Europe, Asia, and Australia/New Zealand; the study in the autologous HSCT population was also conducted in Africa.[1] The primary efficacy end point in both trials was overall vaccine efficacy in reducing the risk of zoster compared with placebo.[1,23] Efficacy against PHN was also evaluated in the autologous HSCT trial.[1] In both trials, cases of zoster were confirmed by PCR or by a clinical evaluation committee.[1]

In the autologous HSCT trial, participants were randomized to receive a 2-dose series of zoster vaccine recombinant, adjuvanted (first dose given 50–70 days after the date of autologous HSCT, second dose given 1–2 months after first dose) or placebo.[1,23] Individuals with an anticipated need for anti-varicella-zoster virus prophylaxis for ≥6 months, a history of infection with or vaccination against varicella or zoster in the past year, or human immunodeficiency virus (HIV) infection were excluded from ZOE-HSCT.[23] Patients in this study were followed for a median of 21 months (range: 0–49.4 months).[1,23] The primary efficacy analysis population (modified total vaccinated cohort) included 1721 patients who received both doses of zoster vaccine recombinant, adjuvanted or placebo and did not develop a confirmed case of herpes zoster within 1 month following the second dose.[1,23] Results of this placebo-controlled trial indicated that 2 doses of zoster vaccine recombinant given 1–2 months apart can reduce the risk of developing zoster in adults undergoing autologous HSCT.[1,23] Overall efficacy of the vaccine in preventing zoster in this population was 68.2%.[1,23] Zoster vaccine recombinant, adjuvanted was also found to be 89.3% effective against PHN, which was attributed to the effect of the vaccine on prevention of herpes zoster.[1,23]

In the hematologic malignancy trial, patients were a mean of 57 years of age, most were White (71%), and 41% were female.[1] Patients were followed for a median duration of 11.1 months (range: 0–15.6 months).[1] The post hoc efficacy analysis included 515 patients who received 2 doses of zoster vaccine recombinant, adjuvanted or placebo and did not develop a confirmed case of herpes zoster within 1 month after the second dose.[1] The post hoc analysis found zoster vaccine recombinant, adjuvanted to be 87.2% effective for prevention of herpes zoster among patients with hematologic malignancies.[1]

Clinical Perspective

Adults 50 Years of Age or Older.

The US Public Health Service Advisory Committee on Immunization Practices (ACIP) guidance for prevention of zoster in immunocompetent adults 50 years of age or older was published in 2018, prior to the discontinuation of zoster vaccine live.[4] For prevention of zoster in this population, ACIP states that zoster vaccine recombinant, adjuvanted is the preferred vaccine and can be used in such individuals regardless of history of zoster or prior vaccination with varicella virus vaccine live or zoster vaccine live.[4] ACIP states that the recombinant zoster vaccine, adjuvanted also is preferred in adults 50 years of age or older with certain chronic medical conditions (e.g., chronic renal failure, diabetes mellitus, rheumatoid arthritis, chronic pulmonary disease).[4]

Immunocompromised Adults 18 Years of Age or Older.

ACIP recommends 2 doses of zoster vaccine recombinant, adjuvanted for prevention of zoster and zoster-associated complications in patients who are ≥19 years of age and are immunodeficient or immunosuppressed.[24] In such patients, 2 doses of zoster vaccine recombinant, adjuvanted should be given regardless of history of herpes zoster or prior vaccination with zoster vaccine live.[24] Doses should be separated by 2–6 months; however, a shorter vaccination schedule (second dose given after 1–2 months) may be considered in select patients.[24] Ideally, the vaccine should be administered prior to the onset of immunosuppression.[24] If it is administered after the onset of immunosuppression, zoster vaccine recombinant should be given at a time when the immune system is likely to be most robust.[24]

Guidelines from the US Department of Health and Human Services (HHS) Panel on prevention and treatment of opportunistic infections in adults and adolescents with HIV recommend administration of zoster vaccine recombinant, adjuvanted to people with HIV who are ≥18 years of age following the FDA-approved vaccine schedule for patients without HIV.[155]

Dosage and Administration

▪ General

Dispensing and Administration Precautions

Appropriate medical treatment and supervision must be available to manage potential acute anaphylactic reactions following administration of zoster vaccine recombinant.[1]

▪ Administration

Zoster vaccine recombinant, adjuvanted is administered only by IM injection.[1] The vaccine should not be administered subcutaneously, intradermally, or IV.[1]

Zoster vaccine recombinant, adjuvanted is commercially available as a kit containing single-dose vials of lyophilized varicella zoster virus (VZV) surface glycoprotein E (gE) antigen and single-dose vials of AS01B adjuvant suspension that requires reconstitution before use.[1] The vaccine is also available as a single-dose prefilled syringe that does not require reconstitution.[1]

Prior to administration of the prefilled syringe, attach a sterile needle.[1] Administer the prefilled syringe as soon as possible following removal from the refrigerator.[1] The prefilled syringe may be stored between 8–25°C for up to 72 hours.[1]

Prior to administration of the kit, reconstitute a single-dose vial of lyophilized VZV gE antigen by adding the entire contents of a single-dose vial of adjuvant suspension from the kit according to the manufacturer's directions.[1] After the adjuvant suspension component is added to the VZV gE antigen component, gently swirl the vaccine tc ensure that the powder is completely dissolved; do not shake vigorously.[1] Consult the manufacturer's labeling for additional information regarding preparation of zoster vaccine recombinant.[1]

Following reconstitution, administer zoster vaccine recombinant, adjuvanted immediately or store at 2–8°C and administer within 6 hours; discard any reconstituted vaccine not used within 6 hours.[1]

Store the kit containing the components of zoster vaccine recombinant, adjuvanted and the prefilled syringe at 2–8°C and protect from light; do not freeze and discard if freezing has occurred.[1]

Zoster vaccine recombinant, adjuvanted does not contain any preservatives.[1]

Zoster vaccine recombinant, adjuvanted may be given concurrently with other age-appropriate vaccines.[4] When multiple vaccines are administered during a single health-care visit, each parenteral vaccine should be given using separate syringes and different injection sites.[4,134] Injection sites should be separated by at least 1 inch (if anatomically feasible) to allow appropriate attribution of any local adverse effects that may occur.[134]

IM Injection

Administer zoster vaccine recombinant, adjuvanted by IM injection, preferably into the deltoid region of the upper arm.[1]

To ensure delivery of the vaccine into muscle, administer IM injections at a 90° angle to the skin using a needle length appropriate for the individual's age and body mass, thickness of adipose tissue and muscle at the injection site, and injection technique.[134] Consider anatomic variability, especially in the deltoid, and use clinical judgment to avoid inadvertent underpenetration or overpenetration of muscle.[134]

▪ Dosage

Prevention of Herpes Zoster Infection

Adults 50 Years of Age or Older.

Zoster vaccine recombinant, adjuvanted is given in a series of 2 doses.[1,4,200,] Each dose consists of 0.5 mL of vaccine.[1,]

Adults 50 years of age or older should receive two 0.5-mL IM doses of zoster vaccine recombinant, adjuvanted given 2–6 months apart.[1,4,200,]

A 2-dose regimen of zoster vaccine recombinant, adjuvanted is indicated regardless of history of herpes zoster or prior vaccination with zoster vaccine live.[4,200,] While serologic evidence of prior varicella is not necessary for zoster vaccination, if evidence of varicella susceptibility becomes available, patients should be vaccinated for varicella first.[200,]

The minimum interval between the 2 doses of zoster vaccine recombinant, adjuvanted is 4 weeks.[134,] The US Public Health Service Advisory Committee on Immunization Practices (ACIP) states that the second dose should be repeated if it was inadvertently given less than 4 weeks after the first dose.[4,]

If interruptions or delays result in an interval longer than 6 months between the 2 doses of zoster vaccine recombinant, adjuvanted, ACIP states that the vaccine series does not need to be restarted; however, efficacy of a dosing interval longer than 6 months has not been evaluated to date.[4,]

Immunocompromised Adults 18 Years of Age or Older.

Zoster vaccine recombinant, adjuvanted is given in a series of 2 doses.[1,24,200,] Each dose consists of 0.5 mL of vaccine.[1,]

Immunocompromised adults 18 years of age or older should receive two 0.5-mL IM doses of zoster vaccine recombinant, adjuvanted given 2–6 months apart, ideally, prior to the onset of immunosuppression.[1,24,200,] Otherwise, consider timing the vaccination when the immune response is likely to be most robust.[24,]

In patients who are or will be immunodeficient or immunosuppressed who would benefit from a shorter vaccination schedule, the second dose can be administered 1–2 months after the first.[24,] If the second dose is given <4 weeks after the first, a valid second dose should be repeated ≥4 weeks after the dose that was given too early.[24,]

A 2-dose regimen of zoster vaccine recombinant, adjuvanted is indicated regardless of history of herpes zoster or prior vaccination with zoster vaccine live.[24,200,] If there is no documented history of varicella, varicella vaccination, or herpes zoster, refer to the clinical considerations for use of zoster vaccine recombinant, adjuvanted in immunocompromised adults ≥19 years of age and the ACIP varicella vaccine recommendations for further guidance.[24,200,]

If interruptions or delays result in an interval longer than 6 months between the 2 doses of zoster vaccine recombinant, adjuvanted, ACIP states that the vaccine series does not need to be restarted.[24,]

▪ Special Populations

Hepatic Impairment

The manufacturer makes no specific dosage recommendations for patients with hepatic impairment.[1,]

Renal Impairment

The manufacturer makes no specific dosage recommendations for patients with renal impairment.[1,]

Geriatric Patients

The manufacturer makes no specific dosage recommendations for geriatric patients.[1,]

Cautions

▪ Contraindications

History of severe allergic reaction (e.g., anaphylaxis) to any component of the vaccine or a previous dose of the vaccine.[1,]

▪ Warnings/Precautions

Preventing and Managing Allergic Vaccine Reactions

Prior to administration of zoster vaccine recombinant, adjuvanted, healthcare providers should review the patient's history with respect to possible sensitivity to the vaccine or previous vaccine-related adverse reactions.[1,]

Appropriate medical treatment should be readily available in case an anaphylactic reaction occurs following administration of zoster vaccine recombinant, adjuvanted.[1,]

Guillain-Barré Syndrome

In a postmarketing observational study, an increased risk of Guillain-Barré syndrome was observed during the 42 days postvaccination with zoster vaccine recombinant, adjuvanted.[1,]

Syncope

Syncope can occur in association with administration of injectable vaccines, including zoster vaccine recombinant, adjuvanted.[1,] Syncope can be accompanied by other transient neurological signs (e.g., visual disturbance, paresthesia, and tonic-clonic limb movements).[1,] Procedures should be in place to avoid falling injury and to restore cerebral perfusion should syncope occur.[1,]

Specific Populations

Pregnancy.

Data are insufficient to establish a vaccine-associated risk with use of zoster vaccine recombinant, adjuvanted in pregnant women.[1] In animal studies, there was no evidence that zoster vaccine recombinant or the AS01B adjuvant component of the vaccine affected fetal development or caused fetal harm.[1]

The US Public Health Service Advisory Committee on Immunization Practices (ACIP) states that consideration should be given to delaying administration of zoster vaccine recombinant, adjuvanted in pregnant women.[4]

Lactation.

It is not known whether zoster vaccine recombinant, adjuvanted is distributed into human milk, affects milk production, or affects the breast-fed infant.[1]

The benefits of breast-feeding and the importance of zoster vaccine recombinant, adjuvanted to the woman should be considered along with the potential adverse effects on the breast-fed child from the vaccine or from the underlying maternal condition (i.e., susceptibility to reactivation of varicella zoster virus [VZV] infection).[1]

ACIP states that administration of a non-live vaccine to a woman who is breast-feeding does not pose risks for the woman or her breast-fed infant.[1,3,4] However, these experts state that consideration should be given to deferring administration of zoster vaccine recombinant, adjuvanted in women who are breast-feeding.[4]

Pediatric Use.

Safety and efficacy of zoster vaccine recombinant, adjuvanted have not been established in pediatric patients and the vaccine is *not* indicated for prevention of primary varicella infection (chickenpox).[1]

Geriatric Use.

In the ZOE-50 and ZOE-70 clinical trials of zoster vaccine recombinant, adjuvanted, 15% of study participants were 60–69 years of age, 47% were 70–79 years of age, and 13% were ≥80 years of age.[1] There were no clinically meaningful differences in efficacy of the vaccine across these age groups; however, adverse effects were reported less frequently in vaccine recipients 70 years of age or older compared with those 50–69 years of age.[1] Among geriatric patients who enrolled into the long-term follow-up study, 17% were 60–69 years of age, 46% were 70–79 years of age, and 9% were ≥80 years of age.[1] From a median of 5.6 to 11.4 years after vaccination, incidence rates of herpes zoster were higher in older age groups (70–79 and >80 years of age) compared with younger age groups (50–59 and 60–69 years of age).[1]

In the clinical trial of zoster vaccine recombinant, adjuvanted in adults who underwent autologous hematopoietic stem cell transplantation (HSCT), 18.7% of study participants were ≥65 years of age.[1] No clinically meaningful differences in efficacy of the vaccine were observed between geriatric patients and younger adults.[1] In the 6 clinical trials of zoster vaccine recombinant, adjuvanted in immunocompromised patients, 21.2% were ≥65 years of age.[1] The frequencies of solicited local and general adverse reactions among geriatric patients were similar to or lower than those reported in younger adults.[1]

▪ Common Adverse Effects

The most common adverse reactions to zoster vaccine recombinant, adjuvanted in patients ≥50 years of age are injection site reactions, including pain (78%), redness (38%), and swelling (26%), and systemic reactions, including myalgia (45%), fatigue (45%), headache (38%), shivering (27%), fever (21%), and GI symptoms (17%).[1]

The most common adverse reactions to zoster vaccine recombinant, adjuvanted in autologous HSCT patients (18–49 and ≥50 years of age, respectively) are pain (88 and 83%), redness (30 and 35%), and swelling (21 and 18%), and systemic reactions, including fatigue (64 and 54%), myalgia (58 and 52%), headache (44 and 30%), GI symptoms (21 and 28%), shivering (31 and 25%), and fever (28 and 18%).[1]

Drug Interactions

▪ Vaccines

Concurrent administration of zoster vaccine recombinant, adjuvanted with other age-appropriate vaccines or toxoids during the same health-care visit (using separate syringes and different injection sites) is not expected to affect immunologic responses or adverse reactions to any of the vaccines.[4]

Influenza Vaccine

Data from an open-label study in adults 50 years of age or older (mean age, 63 years) indicated that concomitant administration of a dose of seasonal quadrivalent influenza virus vaccine inactivated (Fluarix® Quadrivalent) and a dose of zoster vaccine recombinant, adjuvanted does not interfere with the immune responses to either vaccine.[1,4]

Pneumococcal Vaccine

Data from an open-label study in adults 50 years of age or older (mean age, 63 years) indicate that concurrent administration of zoster vaccine recombinant, adjuvanted (first dose of the 2-dose series) and pneumococcal 23-valent vaccine (PPSV23; Pneumovax® 23) followed by the second dose of zoster vaccine recombinant 2 months later does not interfere with the immune responses to either vaccine.[1]

Data from an open-label study in adults 50 years of age or older (mean age, 63 years) indicate that concurrent administration of zoster vaccine recombinant, adjuvanted (first dose of the 2-dose series) and pneumococcal 13-valent conjugate vaccine (PCV13; Prevnar® 13) followed by the second dose of zoster vaccine recombinant, adjuvanted 2 months later does not interfere with the immune responses to either vaccine.[1]

Tetanus Toxoid, Reduced Diphtheria Toxoid, and Acellular Pertussis Vaccine, Adsorbed

Data from an open-label study in adults 50 years of age or older (mean age, 63 years) indicate that concurrent administration of zoster vaccine recombinant, adjuvanted (first dose of the 2-dose series) and tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine, adsorbed (Boostrix®) followed by the second dose of zoster vaccine recombinant, adjuvanted 2 months later does not interfere with the immune responses to either vaccine, with the exception of one of the pertussis antigens (pertactin), which did not meet the noninferiority criterion.[1] The clinical significance of the reduced immune response to pertactin is unknown.[1]

Description

Zoster vaccine recombinant, adjuvanted is an inactivated (recombinant) vaccine used to boost immunity to varicella zoster virus (VZV), thereby reducing the risk of reactivation of VZV and development of herpes zoster (also known as zoster or shingles) and complications of the disease.[1] Zoster vaccine recombinant, adjuvanted is commercially available as a prefilled syringe and as a kit containing single-dose vials of lyophilized VZV surface glycoprotein E (gE) antigen (sterile white powder) and single-dose vials of AS01B adjuvant suspension (opalescent, colorless to pale brown liquid).[1] The recombinant gE antigen component of the kit is prepared using recombinant DNA technology and Chinese hamster ovary (CHO) cells in media containing amino acids (without albumin, antibiotics, or animal-derived proteins) and then purified using chromatography.[1] The adjuvant component of the kit is a liposomal formulation of AS01B composed of 3-O-desacyl-4′-monophosphoryl lipid A (MPL) (produced from *Salmonella minnesota*) and QS-21 (a saponin purified from plant extract *Quillaja saponaria* Molina).[1] The liposomes are composed of dioleoyl phosphatidylcholine (DOPC) and cholesterol in phosphate-buffered saline solution and water for injection.[1] The AS01B adjuvant enhances the immune response to the recombinant VZV gE antigen.[9]

Following reconstitution of a single-dose vial of the VZV gE antigen component with a single-dose vial of the AS01B adjuvant component, each 0.5-mL dose of zoster vaccine recombinant contains 50 mcg of recombinant gE antigen, 50 mcg of MPL, and 50 mcg of QS-21.[1] In addition, each 0.5-mL dose of the vaccine contains 20 mg of sucrose (as stabilizer) and also contains 4.4 mg of sodium chloride, 1 mg of DOPC, 0.54 mg of potassium dihydrogen phosphate, 0.25 mg of cholesterol, 0.16 mg of sodium dihydrogen phosphate dihydrate, 0.15 mg of disodium phosphate anhydrous, 0.12 mg of dipotassium phosphate, and 0.08 mg of polysorbate 80.[1] The vaccine may contain residual amounts of host cell proteins (3% or less) and DNA (2.1 picograms or less) from the manufacturing process.[1]

Administration of a 2-dose vaccination series of zoster vaccine recombinant, adjuvanted in adults 50 years of age or older boosts VZV-specific cell-mediated immune responses and VZV-specific humoral immunity resulting in a reduced risk of zoster and postherpetic neuralgia (PHN) in vaccinees.[1,2,3,4,9] The minimum immune response that correlates with protection against zoster has not been established.[1]

Advice to Patients

The following information contains important points for the clinician to discuss with patients during counseling. For more comprehensive monographs suitable for distribution to the patient, please refer to the *AHFS Patient Medication Information* monographs available from MedlinePlus (https://vsearch.nlm.nih.gov/vivisimo/cgi-bin/query-meta?v:project=medlineplus) (in English and Spanish; written at a 6th- to 8th-grade reading level).

- Prior to administration of zoster vaccine recombinant, adjuvanted, provide a copy of the appropriate CDC Vaccine Information Statement (VIS) to the patient or patient's legal representative (VISs are available at https://www.cdc.gov/vaccines/hcp/vis/index.html (https://www.cdc.gov/vaccines/hcp/vis/index.html)).[1,18]
- Advise the patient of the risks and benefits of vaccination with zoster vaccine recombinant, adjuvanted.[1]
- Advise the patient of the importance of completing the 2-dose immunization series according to the schedule.[1]
- Inform patients about the potential for adverse reactions temporally associated with the vaccine.[1] Clinicians or individuals can report any adverse reactions that occur following vaccination to the Vaccine Adverse Event Reporting System (VAERS) at 800-822-7967 or https://www.vaers.hhs.gov/ (https://www.vaers.hhs.gov/) .[1]
- Advise patients to inform their clinician of existing or contemplated concomitant therapy, including prescription and OTC drugs and dietary and herbal supplements as well as any concomitant illnesses.[1]
- Advise patients to inform their clinician if they are or plan to become pregnant or plan to breast-feed.[1]
- Inform patients of other important precautionary information.[1]

Additional Information

The American Society of Health-System Pharmacists, Inc. represents that the information provided in the accompanying monograph was formulated with a reasonable standard of care, and in conformity with professional standards in the field. Readers are advised that decisions regarding use of drugs are complex medical decisions requiring the independent, informed decision of an appropriate health care professional, and that the information contained in the monograph is provided for informational purposes only. The manufacturer's labeling should be consulted for more detailed information. The American Society of Health-System Pharmacists, Inc. does not endorse or recommend the use of any drug. The information contained in the monograph is not a substitute for medical care.

Preparations

Excipients in commercially available drug preparations may have clinically important effects in some individuals; consult specific product labeling for details.

Zoster Vaccine Recombinant, Adjuvanted (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=NonProprietaryName&ApptName=Zoster+Vaccine+Recombinant%2C+Adjuvanted&collapse=1)

Parenteral

Kit, for IM use

Lyophilized glycoprotein E (gE) Antigen Component consists of 50 mcg of recombinant varicella zoster virus surface gE antigen per 0.5 mL
AS01B Adjuvant Suspension Component consists of 50 mcg of 3-O-desacyl-4′-monophosphoryl lipid A (MPL) and 50 mcg of Quillaja saponaria Molina (QS21) per 0.5 mL

Shingrix® *(available as a kit containing a vial of Lyophilized gE Antigen Component and a vial of Adjuvant Suspension Component)*, GlaxoSmithKline (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=LabelerName&ApptName=GlaxoSmithKline&collapse=1)

Suspension for IM injection

50 mcg of recombinant gE antigen, 50 mcg of MPL, and 50 mcg of QS-21 per 0.5-mL dose

Shingrix® *(available in single-dose prefilled syringes)*, GlaxoSmithKline (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=LabelerName&ApptName=GlaxoSmithKline&collapse=1)

Related Resources

AHFS Patient Medication Information (https://vsearch.nlm.nih.gov/vivisimo/cgi-bin/query-meta?v:project=medlineplus&query=Zoster%20Vaccine%20Recombinant,%20Adjuvanted) and other related patient health topics (MedlinePlus)
ASHP Drug Shortages Resource Center (https://www.ashp.org/Drug-Shortages)
CCRIS (https://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+ccris:%%22Zoster%20Vaccine%20Recombinant,%20Adjuvanted%%22) (Chemical Carcinogenesis Research Information System)
ChemID*plus* (https://chem.nlm.nih.gov/chemidplus/name/Zoster%20Vaccine%20Recombinant,%20Adjuvanted)
Biochemical Data Summary (http://www.drugbank.ca/unearth/q?utf8=%%E2%%9C%%93&query=Zoster%20Vaccine%20Recombinant,%20Adjuvanted&searcher=drugs&approved=1&vet_approved=1&nutraceutical=1&illicit= (US and Canada)
Clinical Trials (https://www.clinicaltrials.gov/ct/search?submit=Search&term=Zoster%20Vaccine%20Recombinant,%20Adjuvanted)
DailyMed (https://dailymed.nlm.nih.gov/dailymed/search.cfm?query=Zoster%20Vaccine%20Recombinant,%20Adjuvanted) (drug labels)
DART (https://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+dart:%%22Zoster%20Vaccine%20Recombinant,%20Adjuvanted%%22) (Developmental and Reproductive Toxicology Database)
Drugs@FDA (https://www.accessdata.fda.gov/scripts/cder/drugsatfda/index.cfm?fuseaction=Search.SearchAction&SearchType=BasicSearch&SearchTerm=Zoster%20Vaccine%20Recombinant,%20Adjuvanted) (approval information)
European Medicines Agency (https://www.ema.europa.eu/en/search/search?search_api_views_fulltext=Zoster%20Vaccine%20Recombinant,%20Adjuvanted)
FDA National Drug Code Directory (https://www.accessdata.fda.gov/scripts/cder/ndc/default.cfm?sugg=NonProprietaryName&ApptName=Zoster%20Vaccine%20Recombinant,%20Adjuvanted&collapse=1)
FDA Recalls, Market Withdrawals, and Safety Alerts (https://www.fda.gov/Safety/Recalls/default.htm)
HSDB (https://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+hsdb:%%22Zoster%20Vaccine%20Recombinant,%20Adjuvanted%%22) (Hazardous Substances Data Bank)
Inxight Drugs (https://drugs.ncats.io/substances?q=%%22Zoster%20Vaccine%20Recombinant,%20Adjuvanted%%22) (National Center for Advancing Translational Sciences)
LactMed (drug effects on breastfeeding) (https://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+lactmed:@or+%%28@na+%%22Zoster%20Vaccine%20Recombinant,%20Adjuvanted%%22+%%29)
New Drug Approvals (https://ahfs.ashp.org/drug-assignments.aspx)
Orange Book (https://www.accessdata.fda.gov/scripts/cder/ob/default.cfm?panel=0&drugname=Zoster%20Vaccine%20Recombinant,%20Adjuvanted) (therapeutic equivalence)
PharmGKB (https://www.pharmgkb.org/search?connections&gaSearch=Zoster%20Vaccine%20Recombinant,%20Adjuvanted&query=Zoster%20Vaccine%20Recombinant,%20Adjuvanted&type=chemical) (Pharmacogenomic data from PharmGKB)
Pillbox (*beta*) (https://pillbox.nlm.nih.gov/pillimage/search_results.php?submit=Search&splid=&getingredient=Zoster%20Vaccine%20Recombinant,%20Adjuvanted) (drug identification and images)
PubMed (https://www.ncbi.nlm.nih.gov/pubmed?DB=pubmed&term=Zoster%20Vaccine%20Recombinant,%20Adjuvanted%%5BAll+Fields%%5D) (scientific journals)
Safety-related Labeling Changes (https://www.accessdata.fda.gov/scripts/cder/safetylabelingchanges) (FDA/CDER)
ToxLine (https://toxnet.nlm.nih.gov/cgi-bin/sis/search2/r?dbs+toxline:%%22Zoster%20Vaccine%20Recombinant,%20Adjuvanted%%22) (Toxicology Literature Online)

† Use is not currently included in the labeling approved by the US Food and Drug Administration.

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