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CASE REPORT

SEROCONVERTION TO HEPATITIS B VACCINE AFTER WEIGHT REDUCTION IN OBESE NON-RESPONDER

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SUMMARY

Decreased responses to hepatitis B vaccine have been associated with some host conditions including obesity. Susceptible non-responders to a primary three-dose vaccine series should be revaccinated. Those who maintain a non-responder condition after revaccination with three vaccine doses are unlikely to develop protection using more doses. This is a description of an obese woman who received six doses of hepatitis B vaccine and persisted as a non-responder. She was submitted to a vertical banded gastroplasty Roux-en-Y gastric bypass Capellas's technique. After weight reduction, she received three additional doses of vaccine and seroconverted. Further studies should help clarify the need to evaluate antibody levels and eventually revaccinate the increasing population of individuals who undergo weight reduction.

KEYWORDS: Hepatitis B; Vaccine; Non-responder; Obesity; Gastroplasty.

CASE REPORT

Hepatitis B vaccine is highly immunogenic. Three vaccine doses induce protective antibodies (anti-HBs ≥ 10 mIU/mL) in over 90% of healthy adults under 40 years of age[3,10,12]. Response to vaccination in children and adolescents occurs in more than 95% of vaccinees[10]. Decreased vaccine responses have been associated with some host conditions, such as older age, male gender, smoking, genetic factors, chronic disease, and obesity[2-3,8,10-12,14,16-19]. Also, poor antibody response in obese persons may be linked to inadvertent injection of vaccine into adipose tissue[16].

Individuals who do not attain anti-HBs ≥ 10 mIU/mL after a primary vaccine series should be revaccinated. Those who maintain a non-responder condition after revaccination with three vaccine doses are unlikely to develop protection using further doses[3,10]. A variable seroconversion rate was achieved after revaccination in different studies[3-5,20-21]. Higher body mass index was associated to lower geometric mean titres (GMTs) after a revaccination series[4].

This is a description of an obese 31-year-old woman, previously susceptible to hepatitis B infection (with negative anti-HBs and anti-HBc antibodies). Her body mass index, weight (kg) / height (m)^2, was 37.3% during the first 3-dose vaccination schedule (0, 1 and 8 months) and 35.7% in the second 3-dose schedule (0, 1, 6 months). Hepatitis B recombinant DNA vaccines were from SmithKlein Beecham Biologicals (Rixensart, Belgium), but for the sixth dose, which was from Merck Sharp Dohme (West Point, USA). All doses were injected intramuscularly into the deltoid muscle. After six vaccine doses, the patient was a non-responder, with negative anti-HBs, anti-HBc and HBs-Ag as assessed by radioimmunoassay (Abbott, USA). Nine months after the last vaccine dose, the patient was submitted to a laparoscopic vertical banded gastroplasty Roux-en-Y gastric bypass, Capellas's technique. She lost weight, and her body mass index dropped to 20.5%. At that time point, she was re-tested for anti-HBs antibodies by electrochemiluminescence assay (Roche) and was not reagent. Although there were no recommendations for revaccination among healthy adults who did not seroconvert after two vaccine series, the patient received a third series of vaccines against hepatitis B from Merck Sharp Dohme (West Point, USA) in a 0, 1, 6 month schedule again in the deltoid muscle. Three months after the third dose, anti-HBs antibody concentration increased to 39 mUI/mL as assessed by electrochemiluminescence (Roche).

Obesity has been associated with many health conditions, such as coronary heart disease, hypertension, diabetes mellitus and dyslipidemia. Obese individuals can also have dysfunction in the immune system[7,9,15]. Previous studies have shown an association between obesity and poor antibody response to hepatitis B vaccine[2-3,12,14,16,18]. Different studies have shown that lymphocytes from obese individuals have altered number and also a reduced lymphoproliferative response to "*in vitro*" stimuli[7,9,15]. TANAKA *et al*. noted that obese subjects had diminished number of $CD3^+$, $CD4^+$ and $CD8^+$ T cells and

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a reduced blastogenic T cell response to mitogens. Interestingly, weight reduction led to an increase in T cell responses and in the number of $CD4^+$ and NK cells[15].

On the other hand, it is known that individuals who do not present a serologic response to hepatitis B vaccine can develop a specific cellular immune response[6]. Also, non-responder individuals to the current licensed hepatitis B vaccine might benefit from new candidate vaccines with different antigens and adjuvants[5,13,22].

As our patient responded to the extra three-dose vaccine scheme after weight reduction, factors such as an altered immune response due to obesity or inadverted injection of previous vaccine doses into adipose tissue might have been responsible for the lack of seroconvertion after two vaccine series. Further studies should help clarify the need to evaluate antibody levels and eventually revaccinate the increasing population of individuals who undergo surgery for weight reduction.

RESUMO

Soroconversão à vacina contra hepatite B após redução de peso em obeso não respondedor

A diminuição da resposta à vacinação contra hepatite B já foi relacionada a algumas condições clínicas, inclusive à obesidade. Indivíduos que não responderam à série de três doses devem ser revacinados. Caso continuem não-respondedores após duas séries de vacina, não há indicação de doses adicionais. Esta é a descrição de mulher obesa que não havia soroconvertido após ter recebido seis doses de vacina contra hepatite B. Ela foi submetida à gastroplastia em Y de Roux, pela técnica de Capella. Após a redução de peso, a paciente recebeu mais três doses de vacina contra hepatite B e soroconverteu. Novos estudos poderão indicar a necessidade de avaliação de níveis de anticorpos contra antígenos vacinais e eventualmente revacinar esta população cada vez maior de pacientes que se submetem à cirurgia para redução de peso.

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