

tient setting has been questioned by some.^{4,5} The predominant concern expressed relates to the timing of postbiopsy complications. The majority of complications in our study (83%) occurred within 6 hours of the biopsy. The remainder of patients with complications had hematuria and/or an insignificant hematoma that presented 72 hours after the biopsy. We therefore conclude that outpatient biopsy represents a valuable, safe, and perhaps cost-effective method of obtaining diagnostic renal tissue.

Manohar Bairy, MRCP
Khalid Beleed, MRCP
Alan T. Webb, MD, FRCP
Sunil Bhandari, FRCP, PhD
Hull Royal Infirmary
Hull, United Kingdom

ACKNOWLEDGEMENTS

Support: None.

Financial Disclosure: None.

SUPPLEMENTARY MATERIAL

Item S1: Protocol for outpatient biopsy.

Note: The supplementary material accompanying this article (doi:10.1053/j.ajkd.2008.06.019) is available at www.ajkd.org.

REFERENCES

1. Fraser IR, Fairley KF: Renal biopsy as an outpatient procedure. *Am J Kidney Dis* 25:876-878, 1995
2. Oviasu E, Ugboaga P: Evaluation of percutaneous renal biopsy as a daycase procedure: experience from Nigeria. *J Nephrol* 11:246-248, 1998
3. Murphy BF, MacIsaac A: Percutaneous renal biopsy as a day-patient procedure. *Am J Kidney Dis* 14:77, 1989
4. Whittier WL, Korbet SM: Timing of complications in percutaneous renal biopsy. *J Am Soc Nephrol* 15:142-147, 2004
5. Marwah DS, Korbet SM: Timing of complications in percutaneous renal biopsy: what is the optimal period of observation? *Am J Kidney Dis* 28:47-52, 1996

© 2008 by the National Kidney Foundation, Inc.
doi:10.1053/j.ajkd.2008.06.019

HYPERSENSITIVITY TO INULIN: A RARE AND MOSTLY BENIGN EVENT

To the Editor:

Inulin (polyfructan) clearance remains the reference for glomerular filtration rate (GFR) determination.^{1,2} Severe hypersensitivity to polyfructan is a rare event. Although food inulin has been increasingly used as a food ingredient because of its potential health benefits,³ only 2 cases of food allergy have been reported.^{4,5} One case of anaphylaxis (cardiorespiratory arrest) after intravenous polyfructan has

also been described.⁶ However, a double-blind placebo-controlled food challenge showed an increase of allergy with inulin.⁴ Therefore, it is unclear whether the observed frequency of severe hypersensitivity to inulin reflects true rarity or underreporting. The objective of this study is to clarify this question.

From January 1, 1998, to July 31, 2001, the department of pharmacovigilance systematically collected all cases of hy-

Table 1. Clinical Data for Patients With Hypersensitivity to Polyfructan: General Data, Past, and Evolution of the Hypersensitivity Reaction

No. of patients	42
Man/woman ratio (%)	50/50
Age (y)	
<15	6 (14)
16-60	32 (76)
>61	4 (10)
Allergic past	
History of allergy	15/42 (35)
History of asthma and bronchial hyperresponsiveness	5/42 (12)
Patients undergoing their first renal function test	23/42 (55)
Clinical symptoms of hypersensitivity	
Respiratory symptoms	11/42 (26)
Bronchospasm	3/11
Dyspnea/wheezing	4/11
Mild respiratory distress (cough)	4/11
Skin and mucosal symptoms	26/42 (62)
General symptoms (arterial hypotension, nausea, vomiting, headache, tachycardia)	5/42 (12)
Time between infusion and beginning of symptoms	
Reaction during the load dose (0-12 min)	34/41 (83)
Reaction during the maintenance dose (13-135 min)	6/41 (15)
Reaction after the end of the infusion	1/41 (2)
Need for treatment of symptoms (steroids, antihistaminic agents, and/or salbutamol)	30/42 (71)
Time taken for the reversal of symptoms (min)	
<10	7/38 (18)
11-30	16/38 (42)
31-60	8/38 (21)
>60	7/38 (18)
Prick test and intradermal test for polyfructan	Performed in 7 patients (children): negative in all

Note: Values expressed as number/total number of patients (percent) unless noted differently.

persensitivity reactions during renal function testing reported by 3 nephrology units by using a standardized questionnaire. During a second period (from January 1, 2003 to December 31, 2006), these adverse effects were collected based on spontaneous notification. For both periods, causality was assessed by using the French method.⁷

During the first and second periods, 31 of 6,328 (0.49%; 95% confidence interval, 0.48 to 0.50) and 26 of 6,086 patients (0.43%; 95% confidence interval, 0.41 to 0.44) experienced adverse reactions, respectively. Complete clinical data were obtained for 42 patients who experienced a hypersensitivity reaction (Table 1). The outcome was rapidly favorable in all cases. No life-threatening complication was observed.

Because 55% of patients with hypersensitivity were undergoing their first GFR measurement, previous sensitization to food inulin was hypothesized. However, there are a number of arguments against such a hypothesis. Increasing use of inulin as a food ingredient should have led to a greater incidence of hypersensitivity during the second period. However, the incidence of hypersensitivity was similar during the 2 periods. The occurrence of reactions during some patients' first-ever inulin-based GFR measurement and the negativity of specific prick tests suggest that immunoglobulin E-mediated hypersensitivity was not involved. Moreover, we observed that repeated GFR measurements in patients who had hypersensitivity during their first renal test did not necessarily lead to another reaction. The absence of reproducibility suggests a nonallergic mechanism. Because reactions mainly occurred during infusion (but not at the very beginning), activation of mast cells may be involved.⁸ Because Toll-like transmembrane receptors can be activated by peptidoglycans,⁹ polyfructan may activate Toll-like transmembrane receptors and the innate immune system during hypersensitivity reactions.

In conclusion, mechanisms underlying hypersensitivity to polyfructan are unclear. Hypersensitivity during inulin-based GFR measurement appears to be rare and mostly benign.

Justine Bacchetta
Pierre Cochat, MD

Hôpital Femme Mère Enfant et Université de Lyon

Florence Villard, MD
Hôpital Femme Mère Enfant

Muriel Astier, MD
Thierry Vial, MD
Hospices Civils de Lyon

Laurence Dubourg, MD, PhD
Aoumeur Hadj-Aissa, MD, PhD
Hôpital Edouard Herriot et Université de Lyon

Behrouz Kassai, MD, PhD
Hospices Civils de Lyon et Université de Lyon
Lyon, France

ACKNOWLEDGEMENTS

Support: None.

Financial Disclosure: None.

REFERENCES

1. Prevot A, Martini S, Guignard JP: [Glomerular filtration markers in pediatrics]. *Rev Med Suisse Romande* 122:625-630, 2002
2. Rahn KH, Heidenreich S, Bruckner D: How to assess glomerular function and damage in humans. *J Hypertens* 17:309-317, 1999
3. Roberfroid MB, Van Loo JA, Gibson GR: The bifidogenic nature of chicory inulin and its hydrolysis products. *J Nutr* 128:11-19, 1998
4. Gay-Crosier F, Schreiber G, Hauser C: Anaphylaxis from inulin in vegetables and processed food. *N Engl J Med* 342:1372, 2000
5. Franck P, Moneret-Vautrin DA, Morisset M, Kanny G, Megret-Gabeaux ML, Olivier JL: Anaphylactic reaction to inulin: First identification of specific IgEs to an inulin protein compound. *Int Arch Allergy Immunol* 136:155-158, 2005
6. Chandra R, Barron JL: Anaphylactic reaction to intravenous sinistrin (Inutest). *Ann Clin Biochem* 39:76, 2002
7. Begaud B, Evreux JC, Jouglard J, Lagier G: [Imputation of the unexpected or toxic effects of drugs. Actualization of the method used in France]. *Therapie* 40:111-118, 1985
8. Tkaczyk C, Jensen BM, Iwaki S, Gilfillan AM: Adaptive and innate immune reactions regulating mast cell activation: From receptor-mediated signaling to responses. *Immunol Allergy Clin North Am* 26:427-450, 2006
9. Takada H, Uehara A: Enhancement of TLR-mediated innate immune responses by peptidoglycans through NOD signaling. *Curr Pharm Des* 12:4163-4172, 2006

© 2008 by the National Kidney Foundation, Inc.
doi:10.1053/j.ajkd.2008.06.008
