

## Urolitiáza v těhotenství I: patofyziologie, důsledky pro plod a diagnostika

C.S. BIYANI and A.D. JOYCE

Pyrah Department of Urology, St James's University Hospital, Leeds UK

---

### Literatura

1. Smellie WA. Treatise on theory and practice of midwifery. Vol. 1. London: The New Sydenham Society, 1752: 148
2. Drago JR, Rohner TJ Jr, Chez RA. Management of urinary calculi in pregnancy. *Urology* 1982; **20**: 578–81
3. Hendricks SK, Ross SO, Krieger JN. An algorithm for diagnosis and therapy of management and complications of urolithiasis during pregnancy. *Surg Gynec Obst* 1991; **172**: 49–54
4. Gorton E, Whitfield HN. Renal calculi in pregnancy. *Br J Urol* 1997; **80** (Suppl. 1): 4–9
5. Coe FL, Parks JH, Lindheimer MD. Nephrolithiasis during pregnancy. *N Engl J Med* 1978; **298**: 324–6
6. Cass AS, Smith CS, Gleich P. Management of urinary calculi in pregnancy. *Urology* 1986; **28**: 370–2
7. Stothers L, Lee LM. Renal colic in pregnancy. *J Urol* 1992; **148**: 1383–7
8. Jones WA, Correa RJ Jr, Ansell JS. Urolithiasis associated with pregnancy. *J Urol* 1979; **122**: 333–5
9. Folger GK. Pain and pregnancy; treatment of painful states complicating pregnancy, with particular emphasis on urinary calculi. *Obst Gynec* 1955; **5**: 513–8
10. Horowitz E, Schmidt JD. Renal calculi in pregnancy. *Clin Obstet Gynecol* 1985; **28**: 324–38
11. Peake SL, Rowburgh HB, Le Planglois S. Ultrasonic assessment of hydronephrosis in pregnancy. *Radiology* 1983; **146**: 167–70
12. Harrow BR, Sloane JA, Salhanith L. Etiology of hydronephrosis of pregnancy. *Surg Gynecol Obstet* 1964; **119**: 1042–5
13. Robert JA. Hydronephrosis of pregnancy. *Urology* 1976; **8**: 1–4
14. Lindheimer MD, Katz AI. The renal response to pregnancy. In Brenner BM, Rector RC eds, *The Kidney*, 2nd edn. Philadelphia: WB Saunders, 1981: 1762–819
15. Harris RE, Dunnihoo DR. The incidence and significance of urinary calculi in pregnancy. *Am J Obstet Gynecol* 1967; **99**: 237–41
16. Yamazaki JN, Schull WJ. Perinatal loss and neurological abnormalities among children of the atomic bomb: Nagasaki and Hiroshima revisited, 1949–89. *JAMA* 1990; **264**: 605–9
17. Brent RL, Gorson RO. Radiation exposure in pregnancy. In Moseley RD, Baker DH, Gorson RO eds, *Current Problems in Radiology*. Chicago: Year Book Medical Publishers, Inc., 1972: 1–48
18. Kinlen LJ, Acheson FD. Diagnostic irradiation, congenital malformations, and spontaneous abortion. *Br J Radiol* 1968; **41**: 648–54
19. Brent RL. The effects of embryonic and fetal exposure to X-rays and isotopes. In Barron WM, Lindheimer MD eds, *Medical Disorders during Pregnancy*, 3rd edn. Chapt 18. Mosby, 2000: 586–610
20. Schull WJ, Otake M. Cognitive function and prenatal exposure to ionising radiation. *Teratology* 1999; **59**: 222–6
21. Janesh RP, Brent RL. Effects of 0.6-Gy postnatal neurophysiologic development in the Wistar rat. *Proc Soc Exp Md* 1986; **181**: 611–9
22. Anonymous. EUR 19603: European Advances in Radiological Protection. Ec-NRPB Agreement of Association Project Co-ordinator Reports for 1996–99 (<http://www.nrp.org.uk/Eur.htm>) 2002

23. Stewart A. The carcinogenic effects of low-level radiation: a reappraisal of epidemiologists, methods and observations. *Health Phys* 1973; **24**: 223–40
24. Lilienfeld AM. Epidemiological studies of the leukemogenic effects of radiation. *Yale J Biol Med* 1966; **39**: 143–64
25. Court-Brown WM, Doll R, Hill RB. Incidence of leukaemia after exposure to diagnostic radiation in utero. *Br Med J* 1960; **2**: 1539–45
26. Osei EK, Faulkner K. Radiation risks from exposure to diagnostic x-rays during pregnancy. *Radiography* 2000; **6**: 131–44
27. Hall EJ. Scientific view of low level radiation risks. *Radiographics* 1991; **11**: 509–18
28. Brent RL. The effect of embryonic and fetal exposure to x-ray, microwaves, and ultrasound. *Clin Obstet Gynecol* 1983; **26**: 484–510
29. Swanson SK, Heilman RL, Eversman WG. Urinary tract stones in pregnancy. *Surg Clin North Am* 1995; **75**: 123–42
30. NRPB. Diagnostic Medical Exposure – Advice on exposure to ionising radiation during pregnancy. Chilton, 1998
31. ARSAC. Notes for Guidance on the Administration of Radioactive Substances to Persons for Purposes of Diagnosis, Treatment or Research. London: Department of Health, 1993
32. Hughes JS, O’Riordan MC. Radiation exposure of the UK population. 1993 Review, NRPB-R263. London: HMSO, 1993
33. NRPB. Board Statement on Diagnostic Medical Exposures to Ionising Radiation During Pregnancy. Documents of the NRPB, Vol. 4, no. 4. London: HMSO, 1993
34. Pedersen H, Finster M. Anaesthetic risk in the pregnant surgical patient. *Anaesthesiology* 1979; **51**: 439–51
35. Barron WM. Medical evaluation of the pregnant patient requiring non-obstetric surgery. *Clin Perinatol* 1985; **12**: 481–93
36. Aselton P, Jick H, Milunsky A, Hunter JR, Stergachis A. First trimester drug use and congenital disorders. *Obstet Gynecol* 1985; **65**: 451–5
37. Alders N. A sign for differentiating uterine from extrauterine complications of pregnancy and puerperium. *Br Med J* 1951; **2**: 1194–5
38. Cope E. Obstructed labour due to vesical calculus. *J Obst Gynaec Br Comm* 1961; **68**: 476
39. Ndirangu K. Bladder calculus causing vesicovaginal fistula in pregnancy. *Br J Urol* 1991; **68**: 433–4
40. Muller-Suur R, Tyden O. Evaluation of hydronephrosis in pregnancy using ultrasound and renography. *Scand J Urol Nephrol* 1985; **19**: 267–73
41. Erickson LM, Nicholson SF, Lewall DB, Lauraline Frischke RTR. Ultrasound evaluation of hydronephrosis of pregnancy. *J Clin Ultrasound* 1979; **7**: 128–32
42. MacNeily AE, Goldenberg SL, Allen GJ, Ajzen SA, Cooperberg PL. Sonographic visualisation of the ureter in pregnancy. *J Urol* 1991; **146**: 298–301
43. Platt JF, Rubin JM, Ellis JH, DiPietro MA. Duplex Doppler US of the kidney: differentiation of obstructive from non-obstructive dilatation. *Radiology* 1989; **171**: 515–7
44. Shokeir AA, Mahran MR, Abdulmaabound M. Renal colic in pregnant women. Role of renal resistive index. *Urology* 2000; **55**: 344–7
45. Tublin ME, Dodd GD, Verdile VP. Acute renal colic: diagnosis with duplex Doppler US. *Radiology* 1994; **193**: 697–701
46. Opdenakker L, Oyen R, Vervlossem I et al. Acute obstruction of collecting system: the intrarenal resistive index is a useful yet time-dependent parameter for diagnosis. *Eur Radiol* 1998; **8**: 1429–32
47. Shokeir AA, Abdulmaabound M. Resistive index in renal colic: a prospective study. *BJU Int* 1999; **83**: 378–82
48. Deyoe LA, Cronan JJ, Breslaw BH, Ridlen MS. New techniques of ultra-

- sound and color doppler in the prospective evaluation of acute renal obstruction: do they replace the intravenous urogram? *Abdom Imaging* 1995; **20**: 58–63
49. Burke BJ, Washowich TL. Ureteral jets in normal second- and third trimester pregnancy. *J Clin Ultrasound* 1998; **26**: 423–6
50. Laing FC, Benson CB, DiSalvo DN, Brown DL, Frates MC, Loughlin KR. Distal ureteral calculi: detection with vaginal US. *Radiology* 1994; **192**: 545–8
51. USNRC. 'Instruction Concerning Risks From Occupational Radiation Exposure', Regulatory Guide 8.29, Revision 1, February 1996
52. Klein EA. Urologic problems of pregnancy. *Obstet Gynecol Surv* 1984; **39**: 605–15
53. Waltzer WC. The urinary tract in pregnancy. *J Urol* 1981; **125**: 271–6
54. Boridy IC, Maklad N, Sandler CM. Suspected urolithiasis in pregnant women. Imaging algorithm and literature review. *Am J Roentgenol* 1996; **167**: 869–75
55. USA Regulatory Commission. Regulatory Guide 8.36 – Radiation dose to the embryo/foetus. [http://www.nrc.gov/NRC/RG/08/08\\_036.html](http://www.nrc.gov/NRC/RG/08/08_036.html)
56. Voigt R, Stoll W, Arndt J. The value of radio-isotope investigations of the urinary tract for the diagnosis of urinary tract calculi during pregnancy. *Geburtshilfe Frauenheilkd* 1980; **40**: 863–7
57. Schwartz J, Crooks LE. NMR imaging procedures: no observable mutation or cytotoxicity in mammalian cells. *Am J Roentgenol* 1982; **139**: 583–6
58. Roy C, Saussine C, Le Bras Y et al. Assessment of painful ureterohydronephrosis during pregnancy by MR urography. *Eur Radiol* 1996; **6**: 334–8
59. Spencer JA, Tomlinson AJ, Weston MJ, Lloyd SN. Early reports. comparison of breath-hold MR excretory urography, doppler ultrasound and isotope renography in evaluation of symptomatic hydronephrosis in pregnancy. *Clin Radiol* 2000; **55**: 446–53
60. National Council on Radiation Protection and Measurement. Medical radiation exposure of pregnant and potentially pregnant women. NCRP Report no. 54, Bethesda, MD: NCRPM, 1977
61. American College of Obstetricians and Gynaecologists Committee on Obstetric Practice. Guidelines for Diagnostic Imaging During Pregnancy. ACOG Committee Opinion no. 158. Washington DC: ACOG, 1995
62. Miller DL. Update on the safety of diagnostic ultrasonography. *J Clin Ultrasound* 1991; **19**: 531–40
63. Shellock FG, Kanal E. Policies, guidelines, and recommendations for MR imaging safety and patient management. *J Mag Reson Imag* 1991; **1**: 97–101
64. US Department of Health and Human Services. Embryo, fetus, infant: recommendations to minimise diagnostic nuclear medicine exposure. HHS publication FDA 86–8254, Washington DC: 1986
65. Wagner KL, Lester RG, Saldana LR. Exposure of the Pregnant Patient to Diagnostic Radiations: a Guide to Medical Management, 2nd edn. USA: Medical Physics Publishing, 1997

#### Autoři:

C.S. Biyani, MS, FRCS(Urol), Specialist Registrar in Urology.

A.D. Joyce, MS, FRCS(Urol), Consultant Urologist.

Korespondence:

A.D. Joyce,  
Pyrah Department of Urology,  
St James' University Hospital,  
Beckett Street, Leeds LS9 7TF, UK.  
e-mail: [adrian.joyce@leedsth.nhs.uk](mailto:adrian.joyce@leedsth.nhs.uk)

Zkratky:

IUGR - intrauterine growth retardation;  
NRPB - National Radiological Protection

Board;

US - ultrasonography;

RI - (renal) resistive index;

MRU - MR urography;

ACOG - American College of Obstetricians  
and Gynecologists.

Institute of Pathological Physiology U Nemocnice 5 , Praha 2, 128 53. DIÄŒE: CZ00216208. IÄŒE: 00216208. tel: +420 224 965 901. fax: +420 224 965 916. e-mail: patfy@lf1.cuni.cz Head: Assoc. Prof. Martin Vokurka, MD, PhD. Welcome at the Institute of Pathological Physiology! The Institute of Pathological Physiology is one of the teaching and research departments of the First Faculty of Medicine. Our web pages include information for students and information about our research activities. We invite you to explore our Web site and encourage you to contact us with questions or comments. Pacienti s urolitiázou jsou dÄŒleÅŒitou soucasti kaÅŒdodenní urologické praxe a ÅŒeseni tohoto casteho onemocnÄŒní je take vaÅŒnÄŒm zdravotním, socialním i ekonomickÄŒm problemem pro jednotlivce i spolecnost. AutoÅŒmi se snaÅŒí strucnÄŒ a pÅŒehlednÄŒ podat informace tÄŒkající se soucasnÄŒch moÅŒností diagnostiky a lecby urolitiázy. Její etiopatogeneze je multifaktoriální, kdy na vznik konkrementÄŒ spolupÅŒsobí ÅŒmáda rizikovÄŒch faktorÄŒ - â€œ endogenních i exogenních, renálních i extrarenálních.