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大鼠肾5/6切除致慢性肾衰后的形态学变化*

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提 要 本文用光镜、电镜和电子自旋共振等技术观察5/6肾切除后大鼠残肾形态、总自由基含量和肾功能,发现大鼠术后30d,有明显氮质血症、残肾总自由基含量增高、残肾单个核炎性细胞浸润;术后60 d,肾小球肥大;术后120 d,肾小球和肾间质纤维化,肾小管扩张,管腔内有蛋白沉积,肾小球滤过膜增厚,足细胞足突融合。假手术对照组和1/6肾切除组大鼠无类似病变。认为这些组织学损害可能与残肾增高的氧自由基的损伤作用有关。

关键词 肾功能衰竭,慢性;游离基类;疾病模型,动物;大鼠

中图法分类号 R692.6

无论原发性或继发性肾脏疾病,只要肾脏损伤到一定程度,即便去除病因,病肾仍将继续进行性地毁损而进入慢性肾衰期,提示在慢性肾衰的发生发展过程中,存在某种共同的机制。大鼠5/6肾切除模型是一个公认的慢性肾衰模型[1],在此模型上系统观察残肾的形态学变化,对于阐明慢性肾衰发生发展机制可能具有一定的理论意义,但目前这方面的研究资料不多。本文用光镜、透射电镜和扫描电镜对大鼠5/6肾切除后的残肾进行观察,同时测定残肾总自由基含量和肾功能,以探讨残肾的形态变化规律及其可能原因和意义。

1 材料和方法

雄性Wistar大鼠75只(本校动物所提供),体重300±50 g,分为3组。Ⅰ组:假手术对照,25只,经背切口暴露肾脏后缝合切口,不切肾。Ⅱ组:1/6肾切除组,25只,经背切除左肾皮质1/3,保留右肾。Ⅲ组:5/6肾切除组,25只,经背切除左肾皮质2/3,1~2周后切除右肾[1]。术中严格无菌操作,术毕切口经0.5%苦味酸溶液涂抹。全部大鼠用本校动物所提供的普通大颗粒饲料喂养,每公斤饲料含蛋白61.3 g、脂肪52.5 g、糖270.2 g,自由进食饮水。各组于术后30、60、90 d取5只大鼠左肾称重后取材作光镜和总自由基含量检查,同时取血查肌酐和尿素氮浓度;术后120 d,取5只大鼠左肾称重后取材作光镜和透射电镜检查,5只大鼠左肾作扫描电镜检查,同时取血查肌酐和尿素氮浓度。供扫描电镜检查用的肾血管铸型采用丙烯腈-丁二烯-苯乙烯(ABS)丁酮液活体灌注法[2]。供光镜和透射电镜检查用的肾标本按常规方法处理。残肾组织总自由基含量用电子自旋共振法测定[3]。血浆尿素氮和肌酐浓度按常规方法测定。文中数据以$\bar{x}\pm s$表示,组间相差显著性采用t检验。

2 结果

Ⅲ组大鼠术后30 d,血浆尿素氮(9.8±1.5 mmol/L)和肌酐浓度(203.2±23.6 μmol/L)显著高于Ⅰ组(分别为5.1±1.6 mmol/L和103.3±30.9 μmol/L,$P<0.01$),并进行性增高。Ⅰ、Ⅱ两组大鼠术后血浆尿素氮和肌酐浓度无显著升高。

Ⅲ组大鼠术后30 d,残肾组织总自由基含量(每克组织14538.6±3013.4二次积分)显著高于Ⅰ组(每克组织5214.6±1107.9二次积分,$P<0.01$)和Ⅱ组(每克组织5869.8±1265.3二次积分,$P<0.01$),以后持续在高水平。Ⅰ、Ⅱ两组术后肾组织总自由基含量无显著改变。

肉眼观,全部大鼠背部切口均一期愈合,无感染。术后30 d,Ⅱ、Ⅲ两组大鼠残肾手术切口均有斑痕形成,未发现漏尿和感染征象,残肾多被大网膜包裹,难以剥离。术后60 d,Ⅲ组大鼠残肾增大,斑痕处内陷,其余部分外凸,形态不规则。术后90 d,Ⅲ组残肾同术后60 d时无大变化。术后120 d,Ⅲ组残肾硬度稍增加,有一定韧性;Ⅲ组残肾无显著增大;Ⅰ组大鼠肾脏无异常发现。Ⅲ组大鼠术后残肾重量逐渐增加,于术后90 d时,接近Ⅰ组大鼠左肾重量;Ⅰ、Ⅱ两组大鼠术后左肾重量无显著变化(表1)。

表1 大鼠左肾重量(g/100g体重)

Tab 1 The weight of left kindney of rats (g/100g bw)

Group	n	Time post operation (days)			
		30	60	90	120
Ⅰ	5	0.51±0.06	0.50±0.07	0.52±0.07	0.51±0.09
Ⅱ	5	0.45±0.06	0.46±0.07	0.46±0.05	0.47±0.08
Ⅲ	5	0.34±0.07※#	0.41±0.08	0.49±0.08	0.48±0.09

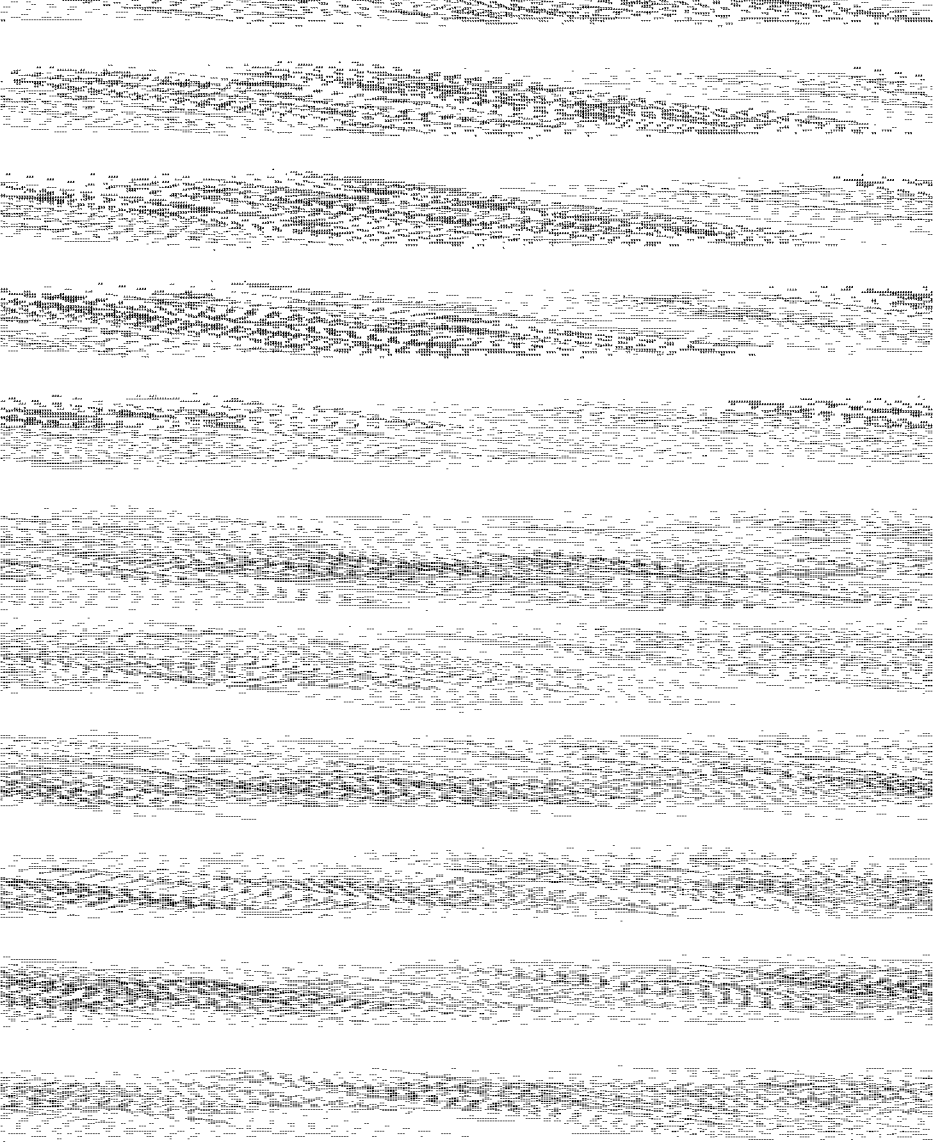
※: Compared with group Ⅰ, $P<0.05$; #: Compared with group Ⅱ, $P<0.05$.

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Studies on the morphological and functional changes of 1/6-Kindney remnant in rats

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Abstract The morphological and functional changes of 1/6-kidney remnant were observed with optical and electron microscopy and electron-spin-resonance spectroscopy in rats in which 5/6 of kidneys had been resected. An increase of the content of free radicals in the remnant kodney and the plasma content of urea nitrogen and creatinine and marked infiltration of mononuclear cells in the remant kidney were found on the 30th day after subtotal nephtectomy; renal glomeruli were enlarged on the 60th day; glomerular and interstitial fibrosis , dilatation of renal tubules with protein sediment in the lumen, thickening of the filtration membrane and fusion of the podocyte processes were found on the 120th day. There were no similar changes in the kidney with sham operation and in 5/6-Kindey remnant. It was believed that the morphological changes might result in certain extent from the harmful effects of the increased renal content of oxygen-derived free radicals.

Key words kideney failure, chronic; free radicals; disease models, animal; rat

戴角膜接触镜并发绿脓杆菌性角膜溃疡

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角膜接触镜具有独特的优点,近几年已被广泛地配戴,尤其受到青年人的青睐。同时并发症也常有发生,甚至造成严重后果,现报道1例如下。

邝××,男,28岁。住院号168262。因左眼红痛、畏光、流泪4 d,加重伴视力剧降1 d 入院。发病前配戴角膜接触镜1年余,矫正视力1.5(双)。入院时查:痛苦面容;视力:右0.3(矫正1.0),左眼前手动。左睑红肿明显,结膜混合充血(卅),水肿(卄),结膜囊大量黄绿色分泌物。角膜水肿,中央8 mm×6 mm溃疡。前房混,见2 mm 脓性液平。虹膜模糊。瞳孔散大(药物性),晶体、眼底不清。右眼(－)。细菌培养:绿脓杆菌生长。诊断:绿脓杆菌性角膜溃疡。治疗:庆大霉素、维生素C 静滴;0.1%多粘菌素B、2%庆大霉素、2500 u/ml 肝素、1%阿托品点眼及口服维生素E、AD 等。17 d 后溃疡基本愈合,辅以消蒙眼膏,狄奥宁眼液,角膜水肿逐渐消退。住院40 d,出院时右0.3(矫正1.2),左0.04。左睑(－),结膜充血(＋),角膜周边透明,中央区轻度混浊,前房清,Tyn(－),瞳孔散大,眼底模糊。3月后复诊,左0.3,角膜中央仅见薄云衣。

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