Betulinic acid lessens oxidative stress and impairment of aortic contraction induced by lipopolysaccharide in rats

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Lipopolysaccharide (LPS) is widely accepted to induce the irreversible vascular hypo-responsiveness in sepsis by oxidative stress. Betulinic acid (BA) has been reported to inhibit oxidative stress and reduce septic lung and kidney injuries. However, whether BA can alleviate the LPS-induced vascular injury remains unclear. To investigate the effect of BA on aortic contraction and oxidative stress in rats exposed to LPS, male Sprague-Dawley rats were pretreated with BA (25 mg/kg/d, i.g.) for 3 days and intraperitoneally injected with LPS (10 mg/kg) at the 4th day. The contraction of isolated thoracic aorta was determined using the organ bath system. The parameters of inflammatory factor interleukin-6 (IL-6) and oxidative stress were measured. We found that IL-6 was significantly increased in plasma and thoracic aorta from LPS-treated rats and the aortic contraction evoked by phenylephrine, KCl and Ca²⁺ was inhibited by LPS. Malondialdehyde level and inducible nitric oxide synthase (iNOS) activity were all markedly increased, while superoxide dismutase (SOD) activity was significantly decreased in the thoracic aorta from LPS-treated rats. All these alterations were reversed by pretreatment with BA. These findings indicate that BA improves aortic contraction in LPS-treated rats, which may associate with activating SOD and inhibiting oxidative stress and iNOS activity.

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