New applications of ultrasounds

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Background

Muscular spasticity due to neurological disorders is a heavy cause of severe pain and disability for many patients compromising the independence and quality life. Baclofen administration is a precious arm against spasticity; anyway, in the chronic patients the oral treatment became often unsatisfactory.

Continuous regular administration of the drug has been seen to be more efficacious for many refractory patients. Intrathecal baclofen therapy (ITB), after subfascial implantation of intrathecal pumps, has been vastly used with satisfactory results in muscular spasticity control. After pump implantation the drug reservoir must be refilled periodically in order to maintain the reduction of spasticity and avoid the symptoms and signs of withdrawal. ITB refilling, which involves the insertion of a needle through the skin until the access port of the pump, is often hard, mainly due to the layer of abdominal fat, spasticity, suboptimal pump positioning, pump rotation or inversion, and scar formation over the implantation site. To avoid the difficulties of ITB refilling radiography or other invasive supportive examinations are often needed.

Personal experience

In our department we daily use US guidance to refill baclofen pump, during the last months of 2016 over 7 patients have been followed. In the majority of cases spasticity came from stroke injury, in two cases patients carry the consequences of major trauma with spinal injury.

In all cases ultrasound machine (Toshiba Aplio XG) with a 10 MHz high-frequency linear array transducer was used to locate the reservoir fill port of the ITB ump. The surface of the intrathecal pump was identified by a well-defined hyperechoic line with acoustic shadowing deep to this line. The reservoir fill port was identified as a hypoechoic area, which is surrounded by the hyperechoic metallic pump.

In most of the cases the procedure is simple, repeatable and US finding totally match with the refilling template. In two “difficult patients” the method was useful also in avoiding long approach for refilling in terms of needle pain and radiological examination.

We describe the possible use of US in the management of intrathecal pump in two intriguing cases with complicated refilling procedure. In both cases because of the deep and mobility of the pump and because of the presences of scars just over the membrane the US was useful.

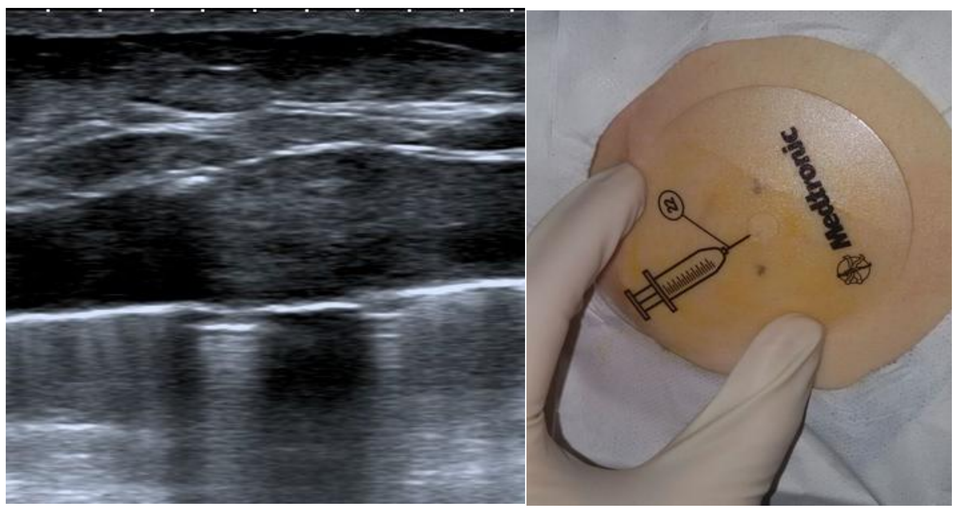

FIGURE 1. US imaging of ITB, surface of the intrathecal pump identified by a well-defined hyperechoic line with acoustic shadowing deep to this line with the shadows of the hole with the membrane. The distance between the skin and the pump was of less than 1cm; Photo pf Belly: Access port of the pump showed with the guidance of the refill template, black spots (marked on the bilateral side of the ultrasonic probe) identified with US completely match with the access of the pump.

FIGURE 2 US imaging of ITB, surface of the intrathecal pump identified by a well-defined hyperechoic line with acoustic shadowing deep to this line with the shadows of the hole with the membrane. The dysomogeneus hyperdense tissue on the surface of the pump characterize the big scars and fat layer. Photo pf Belly: Access port of the pump showed with the guidance of the refill template, black spots (marked on the bilateral side of the ultrasonic probe) identified with US completely match with the access of the pump, cutaneous scars and fat layer.

Conclusion and future perspective

In the last years different new applications for ultrasounds are emerging. In our opinion the use of Doppler ultrasounds in the study of muscles and nerves represent an emerging tool for the physicians. Ultrasound-guided technique may facilitate ITB refill in technically challenging cases. More experiencing data are needed to improve the technique.

References

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