Amphotericin B, a biopharmaceutics classification system (BCS) IV drug, is a highly potent antifungal agent with minimal resistance. Unfortunately, the topical delivery of amphotericin B is difficult due to its limited solubility and poor permeation profile. Thus, an efficient intradermal delivery system is highly sought after for the treatment of prevalent skin fungal infections. The aim of this study is, therefore, to explore the potential of a novel dissolving polymeric microneedle patch to deliver amphotericin B intradermally. The patch (16 × 16 needles, 850 µm height) was cast using aqueous blends of poly(vinyl alcohol) and poly(vinyl pyrrolidone) and contained drugs only in the tips with an amount of 2.80 ± 0.34 mg. This patch showed sufficient mechanical properties to withstand compression and reached an insertion depth of 301.34 ± 46.86 µm in the porcine skin. Moreover, after 24 hours' application, it demonstrates a high drug deposition of 271.40 ± 46.14 µg/cm² amphotericin B in vitro. Dermatokinetic profiles indicated that this patch delivered amphotericin B mainly into the dermis layer and achieved an AUC$_{0-24}$ for the dermis was 356.0 ± 222.3 µg/cm² during a 24-hour application. Furthermore, the antifungal effects of the patches were demonstrated effective against Candida albicans both in in vitro agar plates and in an ex vivo infected porcine skin model. Accordingly, this dissolving microneedle patch containing amphotericin B could be promising to combat skin fungal infections. Moving on, the system will be tested in an animal model.